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PRESIDENTIAL ADDRESS

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THE American Academy of Pediatrics, as you know, is an organization "to foster and stimulate interest in pediatrics and to correlate all aspects of the work for the welfare of children which properly come within the scope of pediatrics." In order to accomplish its aims, each member must realize that he has to take an active interest in the work of the Academy even if doing so should impose some burden on him.

It is fitting to stop for just a moment to pay tribute to a former organization, now deceased, that played a similar role in the life of American children some thirty years ago. I refer to the American Association for the Study and Prevention of Infant Mortality. This association played a major role in reducing the death rate of infants from diarrheal diseases to its present low. This reduction has been the most important contribution of pediatrics in this century. The Association did not have easy sailing and much of its success was due to the efforts of two of its former presidents, Dr. Samuel Hamill and Dr. Philip Van Ingen. To Dr. Henry Gerstenberger we are also indebted for conducting the first "consultation de nourisson," infant welfare station, in the United States which served as a model and which since has been almost universally adopted. The education of the mother to feed and care for her baby properly, the so-called "home modification of milk," as opposed to the distribution of modified milk from milk stations, was successful with surprising rapidity and results. With the gradual introduction of the use of cod-liver oil, starting about 1910, for the prevention and treatment of rickets, another big step forward in child health was taken.

I mention these few facts because the younger members of the Academy cannot realize the status of infant care in 1910, when most infants were fed according to the label on the can or bottle; when

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physicians were not interested in what the baby was fed, leaving it to the mother or nurse; when the average physician prescribed for the sick infant only. We have come a long way since those days when we did not know how many babies died each year, let alone know how many babies were born each year. The calculated mortality in the first decade of the century was 120 to 150 per thousand live births, whereas the present mortality approximates 50 per thousand live births.

In 1930 the White House Conference on Child Health Protection was held. From the discussions it became evident that a national pediatric organization was desirable to further the health of our children; thus the Academy came into being. I do not need to repeat for you all the accomplishments of the Academy. It helped raise the standards of undergraduate and graduate education. It established our JOURNAL OF PEDIATRICS. It promulgated the educational program of our national and regional meetings. It stimulated research and its various committees developed cooperation with all organizations dealing with child health and welfare. The reprint of the *Report of the Committee on Immunization and Therapeutic Procedures* has proved to be more directly helpful and more appreciated by the membership than any other publication of the Academy. Two other subjects that need consideration by similar standing committees of the Academy are the vitamins and the glands of internal secretion. Our understanding of their uses would be greatly clarified by the publication of similar leaflets regularly brought up to date.

Had my term of office been the usual twelve months, the difficulties that have so recently arisen would have plagued my successor and not me, but they are going to plague him and the Academy. With the necessity of providing for an adequate national defense, the danger is imminent that funds available for child health work may become diverted. War today destroys not only soldiers but also civilian populations with destruction of any number of children in a moment, while we strive to save the life of even one child by all means at our command. Under these conditions of war in Europe it is extremely important that we keep our primary objects in mind and do not succumb to a feeling of futility in our efforts.

Our organization may suddenly have placed in its lap many new responsibilities which will demand the help of every Fellow in the Academy. We find ourselves in a crisis that has wiped out, for the time being, all constructive work in the welfare of childhood in Europe —when the starvation of women and children may be the decisive factor in the world struggle. Universities have been closed. Research, as Dr. Parran has very recently said, except as it concerns war problems, has been wiped out in Europe and must be carried on our shoulders for some time to come. It is a direct challenge to us to see that the fight against disease is not allowed to bog down, because we,

too, are spending huge sums of money for defense which may divert money that should rightly be spent in research. In this connection I should like to bring to your attention the necessity for continuing the Council for Pediatric Research. Under Dr. Cooley, as executive secretary, the necessary groundwork has been laid, and, until it becomes entirely self-supporting, I think the Academy should give or obtain the necessary help. We are carrying on a project that may well become a model for the spending of funds available for research in the best possible way.

American pediatrics has made great strides forward in the last thirty years. To quote the opinion given in 1927 by an outstanding German pediatrician, "Sie stehen heute in Amerika in der Pediatrie oben an." ("You are leading the world in pediatrics today.") And I do not feel that I am bragging when I say that in the last twelve years, since 1927, the United States has carried its share of the advance in pediatrics.

With graduate education in pediatrics at a standstill in Europe, our country will in all probability be sought out by our South American colleagues for pediatric education. There has been in recent years evidence of an increased number of visitors from South America, but present conditions make it incumbent on us to make more opportunities available to stimulate this trek. I should like to suggest that the Academy interest itself in procuring fellowships in American pediatrics centers for promising young pediatricians of Central and South America. I know of no way in which we could accomplish more to draw together the pediatricians of the Americas.

We were looking forward to a stimulation of our interest in international pediatrics by the Fifth International Pediatric Congress in Boston next September, but this will have to be postponed for an indefinite period. We do hope that it will not be necessary to let an entire decade elapse before another Congress can be held, as happened after the Great War.

During the past years increased funds have become available for child health and welfare under the Social Security Act. Through its advisory committee the Children's Bureau has sought help as to the most useful way that these appropriations could be spent. Throughout its development of a program the Bureau has cooperated very actively with the members of the medical profession, and no step in the development of its program has been taken without the approval of its advisory committees. The Bureau has been in a measure disappointed that the pediatricians as a whole have not taken a wider interest in the development of this work, and the pediatricians as a whole have felt that they have been left out of the development of the work. I have put it this way because, as President of the Academy, I know the attitude of the pediatricians and, as chairman of one of its advisory

committees, I know of the attitude of the Bureau. With a cooperative spirit at both ends I am sure that the opportunities are available for each one of us to cooperate in this work.

Last spring the President of the United States called a preliminary meeting of the White House Conference on "Children in a Democracy," to be held in Washington in April, 1940. At a time when various ideologic groups were attacking our democratic system of government, it seemed essential that we take stock of what we could do to bring home to our children and ourselves the advantages we are enjoying in living in a democracy. The health of our children will play an important role in this conference. Its follow-up work will need our fullest cooperation to make its effect a lasting one. With the outbreak of the European war, a preliminary conference has been decided on to be held in January, 1940, to bring before the American public the needs of the American child before the emotional tension of war has pushed the needs of the child far into the background. Already a special follow-up committee has been appointed to make plans for carrying out the recommendations to be made by the Conference. This White House Conference will find the pediatricians organized and the membership of the Academy ready to do its share in carrying out the constructive health work for the children in a democracy.

For the past eight years it has been my privilege to serve you as a member of the Executive Board—six years as a regional chairman, and two years as an executive officer. These eight years have covered almost the entire lifetime of the Academy. In its deliberations your Executive Board has always considered first and foremost the welfare of the children of America, by the perfection of our organization as a democratic body to raise the standards of pediatrics, by the continuation of our education, and by bringing pressure to bear on all matters that conduce to the health and happiness of our children.

I now become simply a Fellow, to carry on as a Fellow in the spirit of our first president—"Each member gets out of the Academy as much as he puts into it." If we will all work in this spirit, we shall make of the Academy of the future an even more useful organization to the children of America than it has been in the past.

ELECTROENCEPHALOGRAPHY IN EPILEPSY

FREDERIC A. GIBBS, M.D.
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NO ONE can honestly accept such an honor as this, the Mead Johnson Award, entirely for himself. In honoring one, I believe that it is your purpose to honor all who are engaged in the investigation of problems relating to pediatrics. Any personal glory must be shared with collaborators and predecessors. In the field of epilepsy one cannot fail to acknowledge the important role that has been played by pediatricians. Epilepsy is primarily a disorder of childhood. The cerebral dysrhythmia upon which it is based is presumably present at birth, and the clinical symptoms of the disorder usually manifest themselves at puberty or before. Pediatricians have considered, quite properly, that epilepsy is a problem which is peculiarly theirs. They have contributed greatly to our knowledge of body chemistry in epilepsy and particularly to our understanding of the role of acid-base balance and of water balance in the production or control of seizures. Names that must certainly be mentioned in this connection are those of Gamble,[1] Peterman,[2] Helmholz,[3] Talbot[4] and McQuarrie.[5] They and their associates have made clinical and laboratory observations, the fundamental significance of which is only now being appreciated. To some of you personally, therefore, and to your specialty goes part of the credit for the advances which I am about to report.

My own work in electrophysiology can be properly regarded as an elaboration or continuation of the pioneer observations of numerous independent workers. Most important of these is Hans Berger[6] of Jena, who in 1929 proved beyond question that the brain beats electrically. In his subsequent studies he showed that this beat changes with age, with consciousness, and with changes in the physicochemical state of the body. Normally this beat appears as a mixture of more or less sinusoidal fluctuations in voltage with frequencies ranging from 1 per second to 60 per second (Fig. 1). The most easily discernible rhythm in most normal persons has a frequency of approximately ten per second. These electrical pulsations can be recorded from the surface of the head in much the same way that one records the electrocardiogram from the arms or surface of the chest. The many similarities between the electrical activity of the brain and that of the heart are emphasized by Hallowell Davis in the sentence, "The electroencephalogram is to the brain what the electrocardiogram is to the heart." The voltage obtained from the brain, however, is only about 1/100 of that produced by the heart. Vacuum tube amplification is

From the Neurological Unit of the Boston City Hospital and the Department of Neurology of Harvard Medical School.

E. Mead Johnson Award, American Academy of Pediatrics, 1939.

therefore needed in order to obtain a satisfactory record. It was necessary that amplifiers be designed especially for this purpose. To the men who have devised our amplifying and recording systems we owe a great debt. The progress that has been made in electroencephalography would have been impossible without their help. I, and a number of my colleagues, are particularly indebted to A. M. Grass for the trouble-proof and essentially fool-proof apparatus he has created and for the advice and help he has given on methods of treating electroencephalographic data.

EXAMPLES OF E.E.G.'S FROM CONTROL GROUP

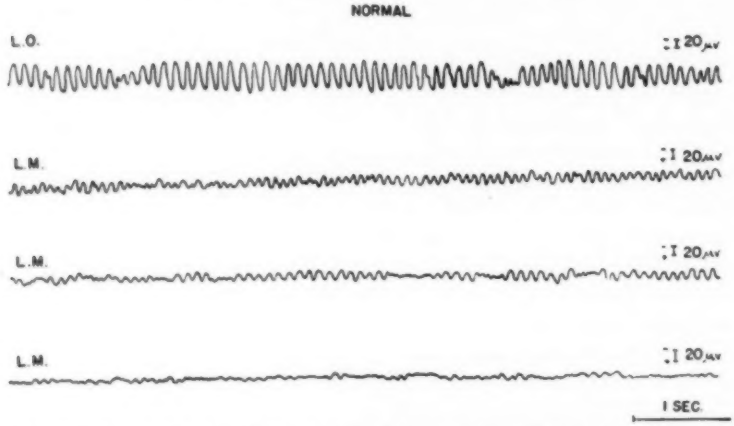

Fig. 1.—The electrical activity of the cortex of four normal subjects. The outstanding feature in each case is a more or less sinusoidal wave with a frequency of approximately ten per second. The voltage varies greatly from one individual to another.

Records were made by pasting a small metal electrode on the surface of the head. The location of this electrode in each case is indicated by the abbreviations at the left hand edge of the strip (*L.O.*, left occipital; *L.M.*, left motor). This cortical or stigmatic electrode was connected to the grid lead of a Grass capacity coupled vacuum tube amplifier. Similar electrodes pasted on the lobes of both ears (referred to as indifferent electrodes) were connected to the ground lead of the amplifier. A Grass ink-writer was used as the recording instrument.

The distance travelled in one second by the paper tape on which the record is written is indicated by the horizontal line labeled *1 sec.* at the right hand margin of the record. The frequency of any given type of wave can be calculated by determining how many such waves can occur in a 1 second length of record. The voltage of a wave can be determined by comparing its height with the height of the deflection produced by a signal of known voltage. The height of this deflection in each instance is shown by the length of the short vertical line at the right margin of each strip. The calibrating voltage in all four of the records shown here was 20/1,000,000 volts. An upward deflection means that the cortex has become negative with respect to the ear.

Amplifiers which are properly designed and constructed provide a perfect image of the electrical fluctuations as they occur on the surface of the head. Essential though amplifiers are in our work, they must be taken for granted. One must focus his attention on the phenomenon being studied, on the electrical beat of the brain.

Many workers have now swarmed into the field of electroencephalography, where Berger so effectively pioneered. I was only one of

the early comers. My own special interest was in the application of this technique to the study of epilepsy. Before I began my work, Fischer[7] had shown that in animals there are changes in the electrical activity of the cortex during convulsions, and Berger[8] had reported similar disturbances in epileptics. It was clear therefore that electroencephalography could teach us something about seizures. The first type of epileptic disorder chosen for study was petit mal. In this study[9] Dr. Hallowell Davis, Dr. William Lennox, and I were collaborators. We quickly found that in petit mal there is an extraordinary abnormality of the electrical beat of the brain, for associated with the attack there is an alternation between a fast and a very slow beat (Fig. 2). The record obtained closely resembles the respiratory tracing in certain types of periodic breathing (Fig. 5). This we described as the wave-and-spike pattern of petit mal.

We next observed[9] that in the tonic phase of a grand mal seizure the brain beats with an abnormally fast rhythm (Fig. 3). The record shows a succession of spiky waves about twice as fast as those which are normally prominent, so that it resembles a respiratory tracing of extreme tachypnea (Fig. 5). With the onset of the clonic phase slower frequencies break up the smooth, fast rhythm of the tonic phase and the record looks like that of tachypnea interspersed with gasps. During the postseizure stupor all activity is abnormally slow.

Subsequent work has been in collaboration with Dr. Lennox and my wife, Erna Leonhardt Gibbs. We found a third type of disorder in association with what we call psychomotor attacks.[10] These include psychic equivalents and all types of seizure in which apparently purposeful movements occur with more or less impairment of consciousness. The behavior of the patient during this type of seizure is like that of a person acting out a dream. Patients with this type of disorder are largely responsible for the bad reputation of epilepties, for in their seizures they may do severe injury to themselves or others, injury which may seem to be conscious or intentional. During an attack the record of the patient shows a succession of slow square waves (Fig. 4) which look like gasps in a tracing of respiration. These are followed by large amplitude moderately slow waves. The record is comparable to that found in the intermediate stages of sleep. Between attacks such patients show bursts of abnormal activity of the same type as appears during the seizure but of shorter duration and lower amplitude. These are often associated with a flash of negativism or destructiveness. Jasper, Solomon, and Bradley[11] reported that many problem children show this type of disorder. Our own later observations on this point are in accord with their conclusion.[12]

The psychomotor type of cortical dysrhythmia is not the only one which occurs in the absence of clinically obvious seizures. Both grand mal and petit mal show subclinical or larval seizures,[13] petit mal more

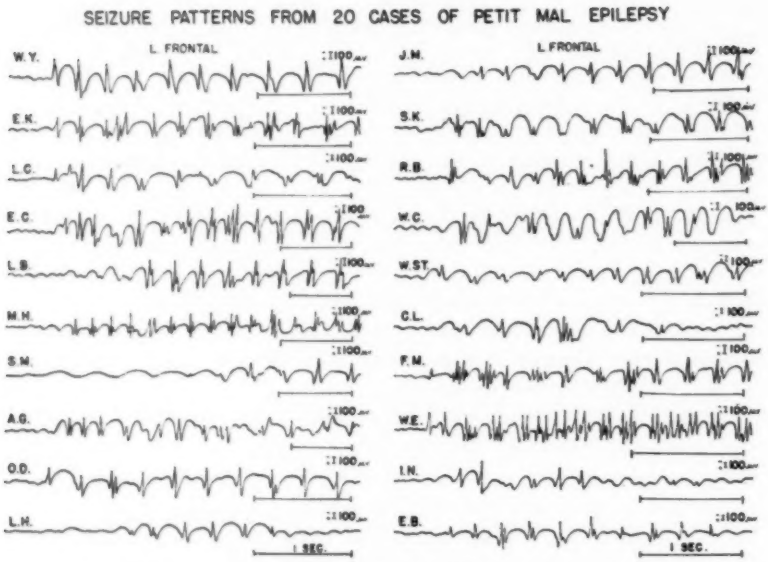

Fig. 2.—Petit mal seizure patterns from 20 patients with petit mal epilepsy.

Recording technique the same as in Fig. 1, except that here the grid electrode was placed over the left frontal area. Patient's initials at left hand edge of each strip. Wave-and-spike formations are obvious in all cases. The duration of the wave-and-spike tends to be about one-third of a second, though it is faster at the start of a seizure and slower at the end. The relatively flat stretch at the beginning of each strip is the patient's normal record. (From Gibbs, F. A., Lennox, W. G., and Gibbs, E. L.: Arch. Neurol. & Psychiat. 36: 1225, 1936.)

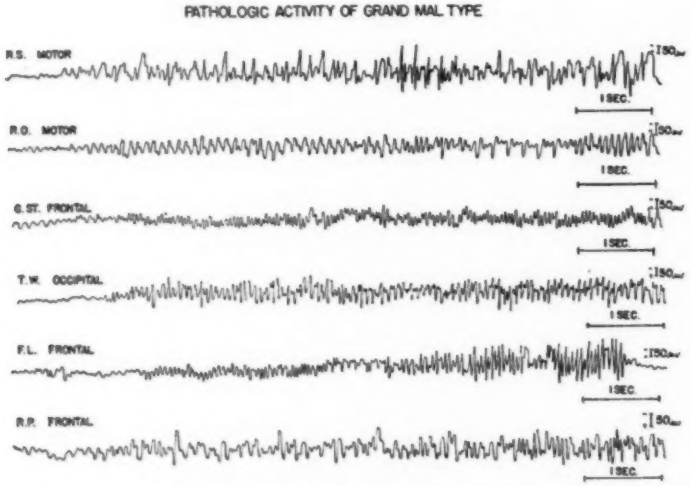

Fig. 3.—Grand mal seizure patterns from six patients with grand mal epilepsy.

A sudden shift to a fast frequency with an increase in amplitude is apparent in all records. Recording made as in Fig. 1. Patient's initials and area of head to which the "cortical" electrode was attached are indicated at the left. A short portion at the extreme left of each record shows the patient's interseizure activity. (Figs. 3 and 4 are from Gibbs, F. A., Gibbs, E. L., and Lennox, W. G.: Arch. Neurol. & Psychiat. 39: 298, 1938.)

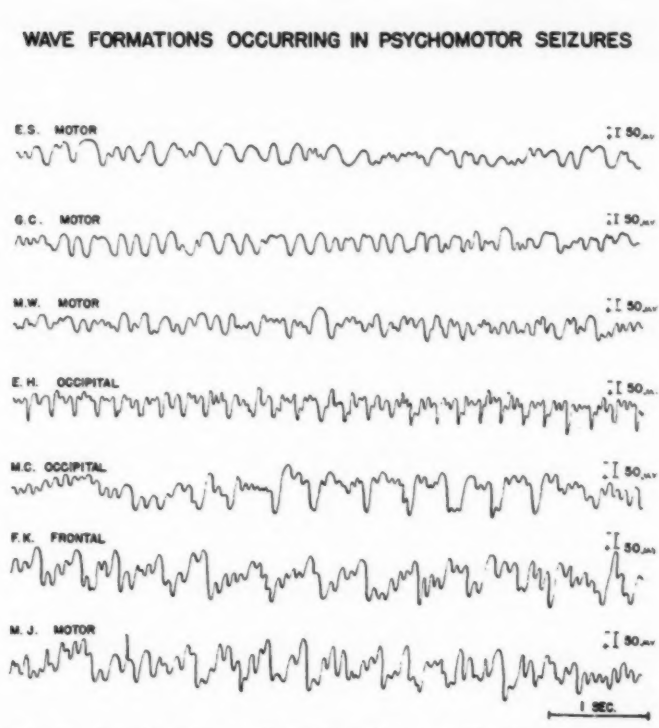

Fig. 4.—Psychomotor seizure patterns from 16 cases with seizures of the "epileptic equivalent" or psychomotor type. Slow square waves (2-4 per sec.) or high voltage rather slow waves (6 to 8 per sec.) are evident in all records. Recording and labeling as in Figs. 1, 2 and 3.

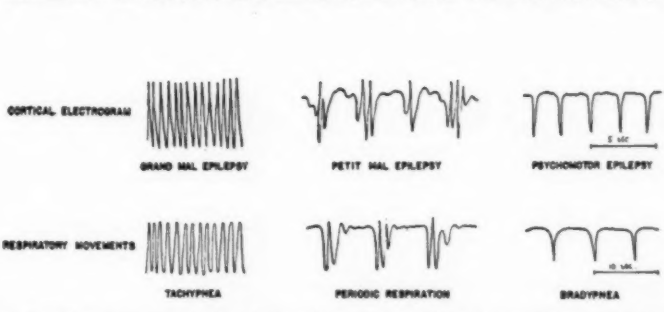

Fig. 5.—The commonest disorders of cortical rhythm have their counterpart in certain common disorders of respiratory rhythm. The new brain and the old brain resemble each other in their pathologic as well as in their normal activity. It should be noted that the time scales for the cortical electrograms and for the records of respiratory movements are not the same. The record of periodic respiration is taken from Mosso, *Life of Man in the High Alps*, London, 1898, T. Fisher Unwin.

commonly than grand mal. Thus it is often possible to obtain evidence that the patient has a particular type of cortical dysrhythmia without having to wait for a clinically observable seizure. Whether or not one diagnoses epilepsy from such evidence will depend on how one defines epilepsy. At present it is my policy to let the diagnosis depend largely on the clinical history and to report that the record shows a great or small amount, as the case may be, of the type of disorder seen during a particular type of seizure, grand mal, petit mal, or psychomotor. Grand mal and petit mal types of disorder, however, occur rarely in those not suffering from clinically obvious epilepsy. The psychomotor type of disorder, on the other hand, is common in problem children, in patients with psychopathic personalities (Fig. 6), in schizophrenia[12] and among the near relatives of epileptics.[14]

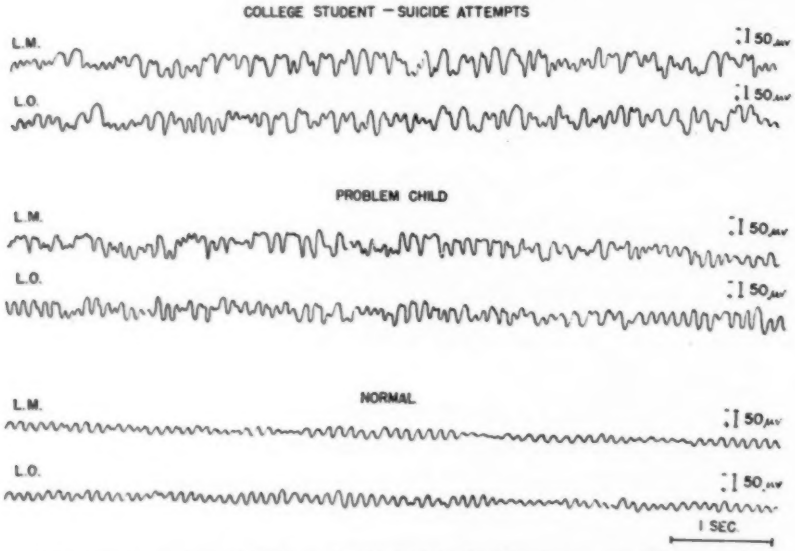

Fig. 6.—Comparison of the records obtained in "problem" persons. The upper two tracings (taken respectively from the left motor and left occipital region) are from a college student considered mentally normal who had on two occasions attempted suicide without adequate provocation. The second record is from a child who had periods of severe misbehavior, causing him to be diagnosed as "psychopathic personality." The third record is from a normal person for purpose of comparison. The records of both patients are full of square topped waves similar to those encountered with patients who have psychic seizures. Recording and labeling as in Fig. 1. (From Gibbs, F. A., Gibbs, E. L., and Lennox, W. G.: Am. J. Psychiat. 95: 255, 1938.)

The abnormalities which appear in the parents of epileptics are particularly interesting (Fig. 7). When both of the parents of an epileptic patient were studied, abnormalities of the same type as are seen in epilepsy were observed in one or both parents in 94 per cent of the pairs. Such abnormalities appeared in only 6 per cent of our control series. The parents appear to have a carrier or subclinical form of epilepsy. This complicates the electroencephalographic diagnosis but

simplifies the study of the hereditary factor. Our data suggest that persons with a cerebral dysrhythmia outnumber actual epileptics 20 to one, a finding which greatly enlarges the scope and the importance of the problem of epilepsy.

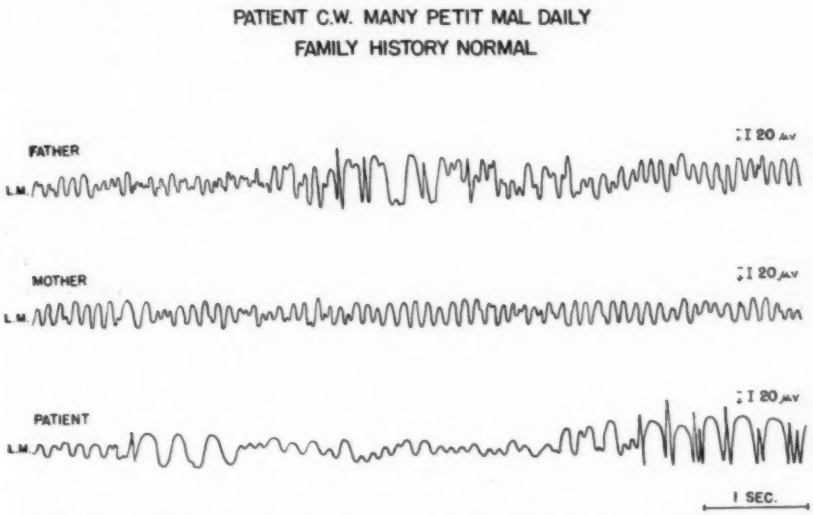

Fig. 7.—Record of abnormal cortical beat in the clinically normal father of an epileptic. Mother's record is borderline normal. Father shows the same type of disorder as the child, namely, petit mal wave-and-spike mixed with psychomotor waves (i. e., square four per second and high voltage six per second waves).

Recording and labeling as in Fig. 1. (From Lennox, W. G., Gibbs, E. L., Gibbs, F. A.: J. A. M. A. 113: 1002, 1939.)

The terms rhythm and dysrhythmia have been used frequently thus far. Little has been said about cortical potentials. This has been intentional. It seems profitable in a general discussion to regard cortical potentials as indicators of electrochemical activity in the brain rather than as a purely electrical disturbance.[15] In the light of what is known about other tissues in the body, the electrical activity of the cortex must have a physiologic and chemical aspect, for the cortex is not unique in possessing an electrochemical beat. Beating is common in many tissues but particularly in nervous tissue. The most familiar central nervous rhythm, the one which has received most study, is that which externalizes itself by way of the respiratory nerves and muscles as breathing. As has been suggested earlier in this report, there is an extraordinary similarity between the activity of the cortex and the activity of the respiratory center. Brain waves are of course about 60 times faster than respiratory waves but otherwise the parallelism as regards frequency is almost perfect.[15] A great variety of factors which alter the frequency of respiration alter the cortical frequency in the same direction (Fig. 8). To mention a few, sleep, sedatives, and low carbon dioxide slow both cortical and respir-

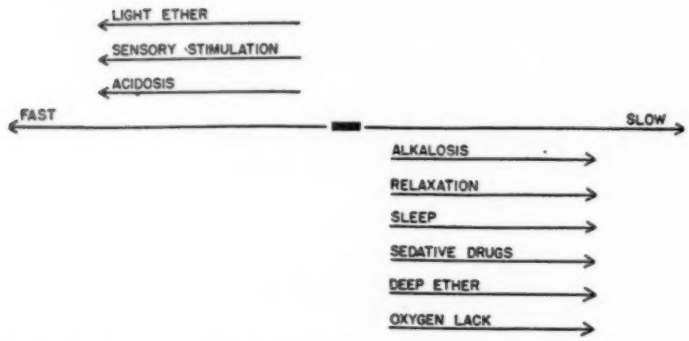

Fig. 8.—Conditions producing similar changes in frequency in the cortex and in the respiratory center. Oxygen lack is listed as slowing the activity of the respiratory center because the hyperpnea which occurs with anoxemia is largely secondary to stimulation of the carotid sinus. (From Heymans, C.: New England J. Med. 219: 147, 1938.)

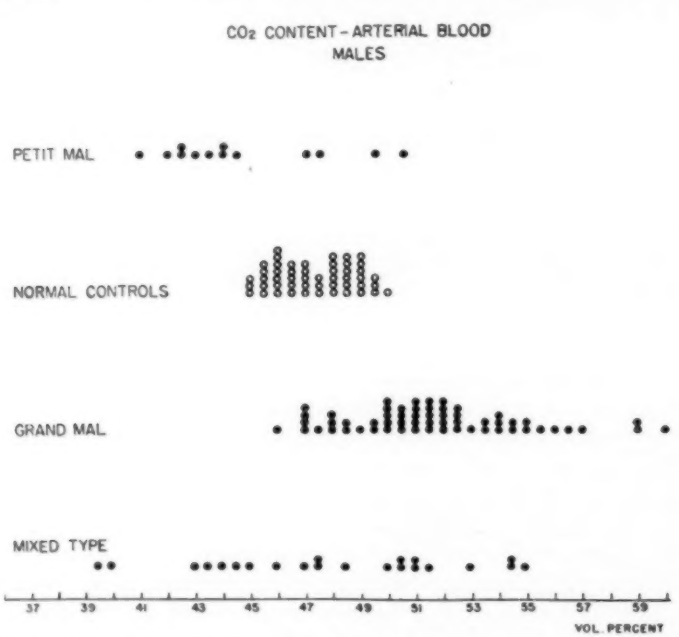

Fig. 9.—Distribution of values for CO_2 content of arterial blood of 94 epileptics and 50 normals. Each dot represents a single determination of blood taken without reference to seizure. The epileptics are divided into three groups as indicated. The group marked *petit mal* includes those with petit mal and no grand mal. That marked *grand mal* includes those with grand mal and no petit mal. The group marked *mixed* includes patients having both petit mal and grand mal seizures. The normal subjects are all found within the narrow limits of 45 to 50 volumes per cent. The petit mal patient tends to be on the low side of this normal zone and the grand mal on the high side. The mixed group spreads out on both sides of normal.

atory rhythms. Fright, sensory stimulation, and high carbon dioxide speed up both cortical and respiratory rhythms. So also with abnormal cortical rhythm: breathing an atmosphere containing a high percentage of carbon dioxide is extraordinarily effective in preventing or stopping the Cheyne-Stokes-like rhythm of petit mal, and low carbon dioxide readily precipitates petit mal seizures.[16] Sedative drugs are particularly effective against the hyperpnea-like activity of the cortex in grand mal, whereas such drugs are relatively ineffective, and sometimes actually harmful, when used against the Cheyne-Stokes-like rhythm of petit mal and the abnormally slow rhythm of psychomotor seizures.

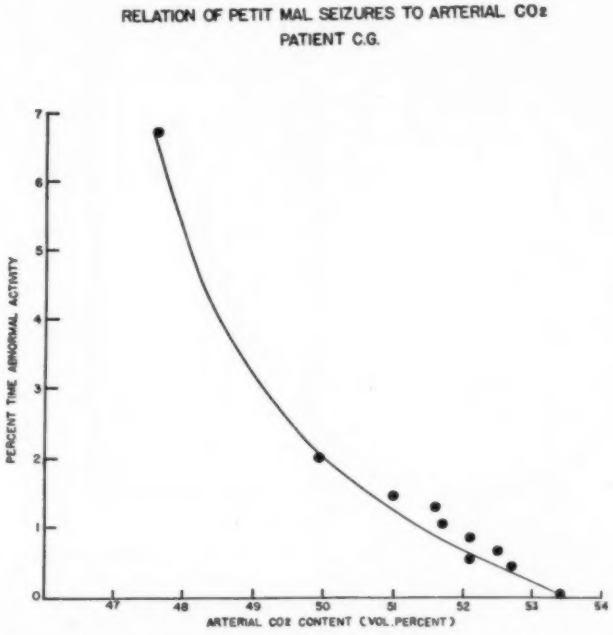

Fig. 10.—Relation between spontaneously appearing wave-and-spike of petit mal and arterial CO_2 content (Patient C. G.).

Samples of arterial blood were obtained during 10 minute runs of electroencephalogram on successive days. CO_2 in volumes per cent (abscissa) is plotted against percentage of 10 minute period during which wave-and-spike formation was present (ordinate).

That the potential fluctuations recorded from the cortex are manifestations of electrochemical charges similar to those which in other areas of the central nervous system externalize themselves in muscle movements, as for example, rhythmic respiratory movements, was first suggested by Adrian. It is, however, not yet generally accepted. By some it is considered a crude analogy. Nevertheless I recommend it, not only as a convenient framework on which to hang much that is

known about cortical activity but as a reference system which affords valuable orientation for an attack on the chemical factors underlying the cerebral dysrhythmias of epilepsy.

If one takes seriously this parallelism between the electrical activity of the cortex and the activity of the respiratory center, one is led to the hypothesis that carbon dioxide plays an important role in the regulation of the cortical beat as it does in the regulation of respiration. We have investigated this point.[17] If one studies the carbon dioxide content of the blood of epileptics, separating those with petit

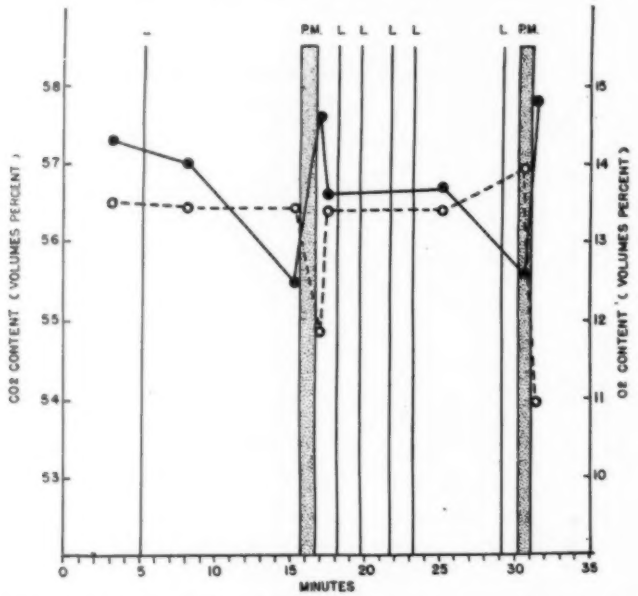

Fig. 11.—Fluctuations in internal jugular CO_2 and O_2 associated with petit mal seizures in patient C. W.

The solid dots represent CO_2 values. The open circles represent O_2 values, both expressed in volumes per cent. *L*—at the top of a vertical line indicates the occurrence of a larval or subthreshold seizure, one that is recorded on the electroencephalogram as a one or two second burst of wave-and-spike activity but which does not give clinical evidence of its presence. *P.M.* above a stippled column indicates a clinically obvious petit mal.

Just before the first petit mal attack a sample of internal jugular blood was obtained which showed that the CO_2 had dropped from around 57 to 55.5 volumes per cent. (The rather high general level of the CO_2 is consistent with the fact that this patient had both petit mal and grand mal.) With the drop in CO_2, however, there was no change in O_2, indicating that this could not have been produced by a change in caliber of the cerebral vessels. After the seizure a cerebral vasoconstriction occurs, indicated here by an increase in CO_2 and a decrease in O_2. The increase in CO_2 is transitory, however, for it drops abruptly to a lower level than in the first two blood samples, and a shower of larval seizures occurs. No sample was obtained before the next seizure, but during the seizure there was a vasodilation (with CO_2 down, O_2 up) which, as previously reported, is a usual occurrence and after the seizure a vasoconstriction occurs as in the preceding petit mal.

This case indicates that, when a sample of blood from the internal jugular vein is obtained just before or in the early part of a petit mal seizure, the CO_2 in that sample is lower than the general level of CO_2 being maintained in the internal jugular blood; that this drop in CO_2 is not necessarily the result of a cerebral vasodilation; and that the cerebral vasodilation during a petit mal seizure is not simply an attempted compensation for a high CO_2, for, on the contrary, during and preceding the seizure the CO_2 is low.

mal from those with grand mal, one finds that patients with petit mal tend to have a lower carbon dioxide content than normal persons and patients with grand mal to have a higher carbon dioxide content (Fig. 9). This, as can be seen, is in line with the assumption that petit mal is the cortical equivalent of Cheyne-Stokes respiration and grand mal the cortical equivalent of hyperpnea. If one follows the spontaneous fluctuations in carbon dioxide content of arterial blood of a petit mal patient from day to day, one finds that when the patient has few seizures the carbon dioxide content is high (Fig. 10); when he has many seizures it is low. That the seizures do not cause a fall in carbon dioxide is indicated by the fact that if blood samples are taken before, during and after a seizure, a sudden drop in carbon dioxide is detected just before the seizure (Fig. 11). After the seizure, the carbon dioxide

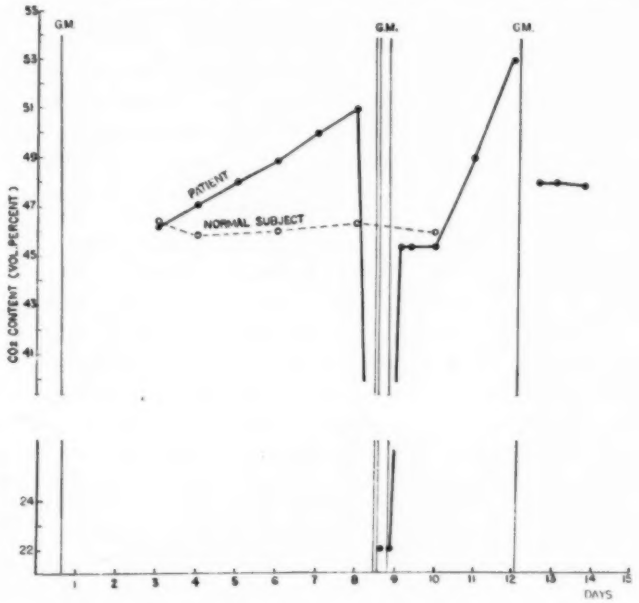

Fig. 12.—Relation of grand mal seizures to variations in CO_2 content of arterial blood in patient J. subject to frequent petit mal and to grand mal several times weekly. The CO_2 content of arterial blood was determined daily; these values are indicated by heavy line and solid dots. For purposes of comparison the CO_2 content of the arterial blood of a normal subject is shown with broken line and open circle. Vertical lines with *G.M.* above indicate grand mal seizures.

As can be seen there is a steady climb in the CO_2 content of the arterial blood before the seizures. A drop occurs with or before the seizures, whether before or with cannot be determined from these data.

level rises to a level higher than that which preceded the seizure. If the arterial blood of a grand mal patient is examined day by day, one finds that the carbon dioxide content rises until a seizure occurs. With the seizure the carbon dioxide falls and after the seizure the carbon

dioxide rises again (Fig. 12). We have not carried out similar studies on patients with psychomotor seizures. These observations do not tell us the underlying chemical basis of epilepsy, but they are a step in that direction, and in our estimation it is in that direction that the basic cause of epilepsy will be found. This work has just begun. We cannot yet guess how far we can go. Electroencephalography carried out in conjunction with refined chemical methods of studying brain metabolism may be the key to the problem.

Bright though the future of electroencephalography appears, this new technique can be judged now on the basis of what it has already achieved. It has revolutionized the study of epilepsy. It has brought us a step nearer to an understanding of the fundamental nature of epileptic seizures. Today, thanks to the electroencephalograph, we know that these are externalizations of the severest paroxysms of cerebral dysrhythmia, that between these extremely severe paroxysms there are more or less continuous disturbances of the cerebral beat. In practice, the amount of disordered beating on a given day can be used as an index of the patient's condition. Such an index usually shows many hours in advance of a seizure that a seizure is impending.[10a] Seizures are therefore no longer unpredictable (Fig. 13).

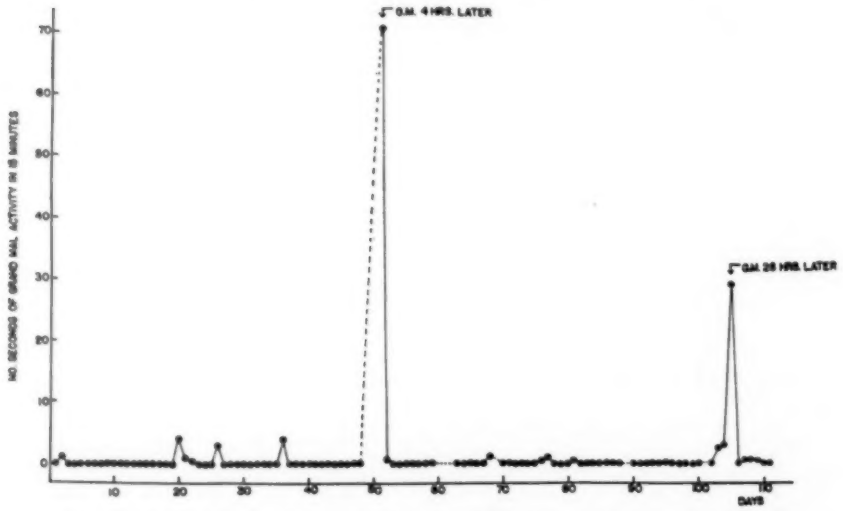

Fig. 13.—The prediction of grand mal seizures from the amount of abnormal fast activity in the record. (One patient.) A daily 15-minute record was taken except for days when the patient was away on a trip. The amount of abnormal fast activity in each day's record was plotted. A marked increase preceded a seizure. From this increase it is possible to predict a seizure several hours or even a day before it occurs.

The amount of abnormal beating is also practically useful in evaluating the results of therapy on a short-time basis.[16] Furthermore, as has been said previously, where treatment of cerebral dysrhythmias

is symptomatic, and the present drug therapy of epilepsy appears to be mainly symptomatic, it is important to determine whether the seizure is one associated with a beat which is too fast or too slow. Therefore, in prescribing the treatment, the electroencephalogram is also of value.

It is possible, in some cases, with the aid of the electroencephalogram to discover where the seizure originates.[13] Occasionally such a seizure focus at operation is found to lie on the border of an unsuspected subdural hematoma or a neoplasm.[18] More often it lies in or near an area of cortical atrophy or in the neighborhood of a few dilated blood vessels. Where a constant seizure focus can be found it seems wise to perform an exploratory operation in the hope that a gross operable lesion will be discovered. A word of caution is necessary at this point. Our own very limited experience (three cases) suggests that without gross pathology the surgical removal of an "epileptic focus" even though clearly localized with the electroencephalogram, is no more successful therapeutically than the removal of "epileptic foci" localized by other methods. It is evident, from a case described by Walter[19] and from two cases of our own, that a sharply localized "epileptic focus" can be removed and the epilepsy remain. One must assume, therefore, that in some cases the focus is not the only disordered region but is merely the most seriously disordered. In most epileptics a constant focus cannot be found. Apparently any part of the cortex may be the site of an epileptic discharge. The question—Where do epileptic seizures start?—can, so far as the cortex is concerned, now be answered: Sometimes in one part and sometimes in another.

Because of electroencephalography, the diagnosis of epilepsy no longer depends entirely on the report or observation of a seizure, for the finding of disorders of the cortical beat, such as occur in epilepsy, are presumptive evidence of epilepsy. One must remember, however, that there is a carrier form of the disorder which is not accompanied by what are generally recognized as symptoms of epilepsy. This epileptic fringe includes many problem children, individuals with personality disorders, and approximately one-half of the near relatives of epileptics. The detection of epilepsy in its subclinical form will, in many cases, modify the medical or psychiatric diagnosis. Because cortical dysrhythmia can give rise to curious aberrations of behavior and may show itself as clinical epilepsy only in succeeding generations, the problem of epilepsy assumes new proportions. It has sociological and genetic implications which it did not have before.

We have expanded the term *epilepsy* to include many who believed themselves well. Let us hope that further research will show a way to stabilize the beat of the brain in order that at least the severest paroxysmal cerebral dysrhythmias may be prevented. Until more can be done for those who are obviously and cruelly afflicted, there is no

great cause for rejoicing. But the walls of our ignorance are giving way. This is the time to renew our efforts, for the real victory is still to be won. In this final victory, I have no doubt that pediatricians will play an important role.

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CYSTIC FIBROSIS OF THE PANCREAS, VITAMIN A DEFICIENCY, AND BRONCHIECTASIS

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PANCREATIC deficiency in infancy and childhood has been occasionally recognized for many years but has been considered rather infrequent. Recent observations indicate that it is the recognition rather than the disease that is unusual. The object of the present work has been to collect and correlate all the available information as to the clinical course and post-mortem findings in cases of cystic fibrosis of the pancreas in the hope of establishing a basis for the diagnosis of the disease during life and hence of studying the disease with a view to treatment.

My interest in the problem was stimulated by the post-mortem findings in a child of 3 years who had presented the clinical picture of celiac disease. When first seen at the age of 23 months, the patient showed the delayed development, muscular weakness, flat buttocks, prominent abdomen and fretful disposition which are familiar in the celiac syndrome. Hunger was also a prominent symptom. She was beginning to talk but had never walked alone. At the age of 4 months, when cereals were first begun, she was observed to have large bowel movements. These continued and before the age of 1 year she had a persistent mild diarrhea. The stools were large and foul with a high content of fat, 69 per cent of which was in the form of fatty acids. She was placed on a low starch and low fat diet in which the calories were supplied chiefly by protein milk and bananas. She improved rapidly and one year later appeared nearly normal for her age, and her weight had increased from 7.0 to 12.3 kg. The stools were still abnormal. In the past, two criteria have been used to distinguish celiac disease from pancreatic steatorrhea, namely the normal proportion of split fat in the stools, and the favorable response to a celiac regime in the former; according to these she had celiac rather than pancreatic disease. Her story differed from the usual one in the early onset, the absence of acute, severe diarrhea, and in the evident hunger. At the age of 3 years she was readmitted to the hospital for repair of a congenital torticollis. She developed postoperative pneumonia and died three weeks later. The essential post-mortem findings were in the pancreas, the liver, and the lungs. The pancreas was small,

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soft, and flabby and somewhat gritty on section. The lobules were irregular and rounded. A search for the pancreatic duct revealed only a small one which extended 8 mm. from the ampulla and was then lost in fibrous tissue. On microscopic examination the pancreas was found to be composed of small and large cysts and a few tubules, embedded in a mass of fibrous tissue. The smaller cysts were lined by cuboidal epithelium, the larger ones by a line of flat cells. Most of the lumina contained round masses of eosinophilic material resembling corpora amylacea. In some, this material appeared fragmented and surrounded by a paler, finely granular matrix. The islands of Langerhans were normal in number and in appearance. There was no evidence of acute inflammation although occasional lymphocytes were present. The liver was large and fatty. The lungs showed scattered small abscesses, purulent bronchitis, and lobular pneumonia.

Consideration of this case brought conviction that the symptoms were in all probability due to the pancreatic lesion. A search was instituted for further similar cases in the literature and also in the autopsy files of the Babies Hospital. Inspection of the last 1,000 autopsies in the Babies Hospital produced 605 cases in which the pancreas had been sectioned, and in 20 of these cases the pancreas showed cystic fibrosis, an incidence of approximately 3 per cent. Most of these patients had died of chronic pneumonia before the age of 6 months and several were thought to have congenital bronchiectasis. Further cases obtained from the literature on celiac disease and vitamin A deficiency and others contributed from various colleagues brought the total number up to 49 cases by the spring of 1938. Since that time the number of known cases has been approximately doubled.

Analysis of this material shows that the cases fall into three clinical groups.

I. Approximately 10 per cent of them die during the first week or two of life because of intestinal obstruction, usually due either to atresia of the small intestine or to the presence of inspissated meconium in a patent intestinal lumen.

II. A group of cases in infants who died of chronic bronchopneumonia or bronchiectasis before the age of 6 months. This group forms 60 per cent of the Babies Hospital series, but until the last two years only a few were reported in the literature.

III. A group who survived for 6 months to 14½ years and who presented the celiac syndrome.

The diagnosis is most difficult in the second group, those in whom respiratory symptoms predominate and who die in infancy. Study of the Hospital charts and, more recently, of patients on the wards, has shown that these infants present a clinical picture which at least suggests pancreatic disease. The usual story is as follows: The parents may state that they have lost one or more previous babies because they

"didn't do well and then got bronchopneumonia." The present child appeared normal at birth and did well for one to eight weeks. It then failed to gain, although the food was taken well, and the baby seemed hungry. The occurrence of large foul stools may have been first noted at birth or at varying ages up to 6 months and often has become obvious only after the addition of cereal to the diet. The baby has frequent colds, or one cold which he does not throw off, and is admitted to the hospital because of the cough. In the hospital the diagnosis of chronic bronchopneumonia or diffuse bilateral bronchiectasis is made. The child's failure to gain is reasonably attributed to the infection. In occasional cases there is xerophthalmia which responds slowly to therapy. The respiratory infection increases slowly or swiftly to a fatal termination. At autopsy the lungs show bilateral diffuse bronchopneumonia or bronchiectasis, usually with acute bronchiogenic abscesses containing *Staphylococcus aureus*. The pancreatic lesion has been noted but usually has been considered as an accidental finding or as the result of dehydration.

The third group is composed of a smaller proportion of the cases, 20 per cent according to our series, but a large number are reported in the literature. In it belong those patients surviving for six months to fourteen and one-half years, long enough for the diagnosis of celiac disease or pancreatic steatorrhea to have been made. The early history of these children is similar to that in the previous group, except for the later appearance of respiratory infections. Nearly all were considered as cases of celiac disease during the last half of the first year and were given appropriate diets with more or less benefit. The susceptibility to respiratory infections and the ultimate appearance of bronchopneumonia or bronchiectasis are the same. So far as is known none have survived longer than fourteen and one-half years.

The clinical diagnosis of cystic fibrosis of the pancreas is not easy. The disease may be strongly suspected in any infant or child who has had steatorrhea in the first months of life and has shown delayed development in the presence of a good appetite and adequate diet and in the absence of much vomiting or diarrhea. A story of repeated respiratory infections, or of corneal ulcers, or the discovery of bronchiectasis in a young infant should lead to an investigation of pancreatic function. The best available proof of the diagnosis is the absence of pancreatic trypsin and lipase in the duodenal juice. Other laboratory determinations are of some assistance. The blood amylase is sometimes elevated. The glucose tolerance curve is usually flat but may show an initial sharp rise and rapid fall, as in the hunger curves described by Harris. In my experience analysis of the stool for fat gives variable results, largely depending on the diet. On a formula of diluted evaporated milk with about 5 per cent added carbohydrate in the form of soluble sugars, the stool fat may be as high as 60 per

cent of the dried weight and the proportion of neutral fat is elevated. The same patient on a low fat diet may show a normal amount of stool fat, most of which is split. This circumstance probably accounts for the varying figures in the cases reported in the literature, where the diet has rarely been controlled. The serum cholesterol has been measured in two cases and was quite low in both. The hemoglobin and blood counts are normal until affected by infection. The urine is usually normal but occasionally shows the characteristics of pyelitis.

The etiology of cystic fibrosis of the pancreas is unknown. In most, if not all, cases the disease is present at birth. It may occur in several siblings and is twice as frequent in the female as in the male. It is not confined to one race, country, or climate. The pancreatic lesions themselves may be interpreted as due to the obstruction of the small or large ducts. In some cases the ducts of Wirsung and Santorini are normal; in others, one or both ducts are atretic. There are several congenital anomalies which are repeatedly found in association with the pancreatic lesion. These are all atresias of some epithelial-lined passage: the intestines, the ureters, the cystic duct, or a biliary cirrhosis presumably due to atresia of the small bile ducts, since the large ducts are normal.

The pathologic physiology is a matter of great interest and appears increasingly complex the more it is studied. The clinical picture is the composite result of the failure to absorb various foods. Obviously some food can be absorbed without benefit of pancreatic digestion because the infants do gain. It also appears clear that some foods are more completely absorbed than others. It is of great clinical importance to discover more exactly which of the necessary food substances are most affected. At present we have good evidence that these patients can utilize protein and bananas fairly well, and cereal starches almost not at all. Even with our best efforts they are usually deficient in (1) caloric intake, (2) fats and (3) vitamin A, and possibly also vitamin D. The clinical problem resolves itself into devising means for counteracting these deficiencies. We have learned that the caloric intake as indicated by the weight curve may be greatly improved by giving 20-40 per cent more than the estimated caloric requirement, and that the patients are usually able to take that amount. It may also be improved by the selection of foods. So far, the best results have been obtained by a low-starch diet which differs from the usual celiac diet only in the use of diluted evaporated milk shaken with powdered pancreatin just before feeding in place of the protein milk. This treatment lacks something of perfection, and we hope to improve on it. Generous administration of vitamin A appears essential either by mouth or by the injection of carotene.

A brief discussion of the relation of vitamin A to this disease is important. The existence of this relationship was suggested to me

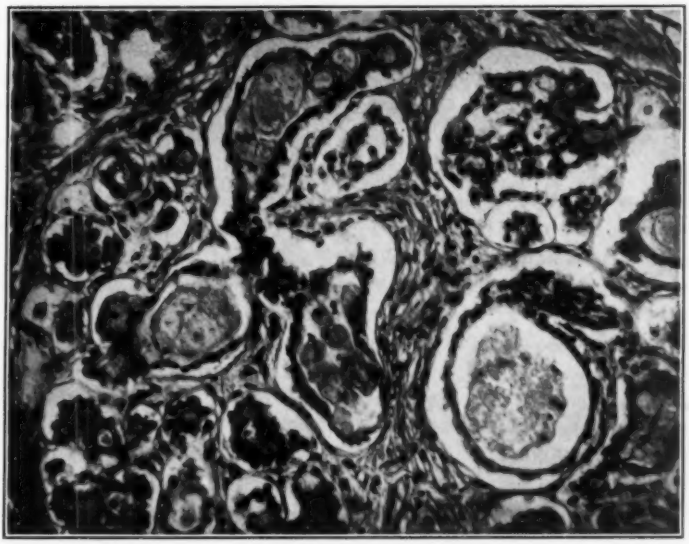

Fig. 1.—Pancreas of M. D., an infant who had xerophthalmia which responded to treatment, but who later died of bronchiectasis.

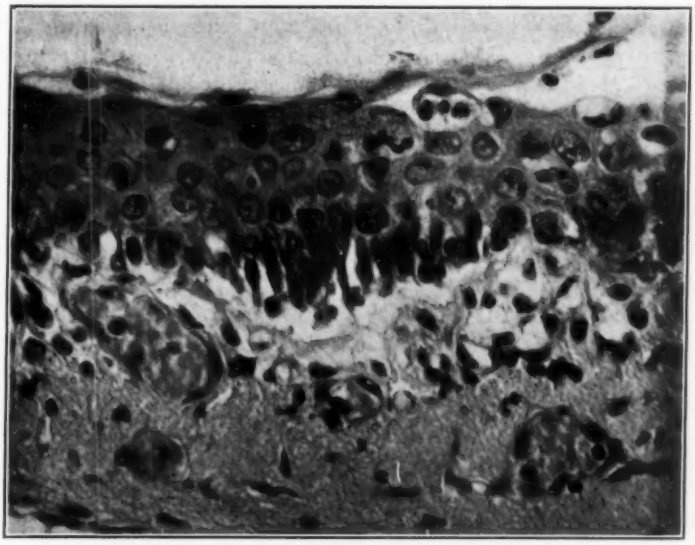

Fig. 2.—Metaplasia of tracheal epithelium, in M. D.

by a patient which we observed two years ago. This boy was the second child. The first, a girl, had died of bronchopneumonia two years before at the age of 9 months. The infant in question appeared normal at birth but did not do well, and a great many formulas were tried. The parents were reluctant to give cod liver oil, for they insisted that it "went right through the child" and produced diarrhea. At three months the baby developed bilateral corneal ulcers. A diagnosis of xerophthalmia was made, and carotene was administered by mouth and also directly to the eyes, with slow healing of the ulcers, which was not complete for about two months. At 4 months roentgenograms of the chest and abdomen appeared normal. The patient then developed a chronic bronchopneumonia, and progressive bilateral bronchiectasis terminating fatally at the age of 6 months. During the latter part of his course he had intermittent pyuria. At post-mortem examination he was found to have cystic fibrosis of the pancreas (Fig. 1), chronic interstitial nephritis, diffuse bronchiectasis, and acute bronchiectatic abscesses. After careful search a few small areas of keratinizing metaplasia of the epithelium were found in the bronchi, and it seemed probable that the vitamin A therapy had been fairly effective in restoring the epithelium if not in curing the resulting bronchiectasis (Fig. 2). I then learned that an autopsy had been performed on the older sibling, and through the kindness of Dr. Klemperer of the Mount Sinai Hospital I was able to study this case also. The clinical course had been closely similar to that of the boy, with the exception that no xerophthalmia had been noted and no intensive vitamin A therapy had been given. The lesions in the pancreas and lung were almost identical, except that in the older sister there was much more extensive metaplasia of the bronchial epithelium. A search through the literature produced 12 cases of vitamin A deficiency in infancy with post-mortem examination, in 7 of which the pancreas had been examined microscopically. All seven showed cystic fibrosis of the pancreas. There is evidence of vitamin A deficiency in 10 of the 49 cases of my pancreatic fibrosis series.

It has been found that vitamin A is always closely associated with fat, not only in foods, but in the intestinal tract, the blood serum, and in the various organs. If fat is left unabsorbed in the intestine, the vitamin remains with it. During the past year the Carr-Price method has been applied to the measurement of vitamin A in human serum by Clausen and McCoord and by Blackfan and May. These workers have developed a vitamin A absorption curve, similar in plan to the familiar glucose tolerance curve, and have demonstrated a low serum vitamin A and a flat absorption curve in cases of celiac disease and also in several cases of cystic fibrosis of the pancreas. They have been able to bring the serum vitamin A up to normal levels by the use of large doses of the vitamin over a long period. Recent work by Josephs

has shown a close correlation between serum lipids and serum vitamin A. This suggests the possibility that when serum lipids are low even the parenteral administration of vitamin A may be ineffective because of inadequate transportation facilities within the body. It appears, therefore, that the level of serum lipids should be studied in cases of pancreatic disease. The serum cholesterol was abnormally low in the two cases where it was measured, and we have not as yet succeeded in raising it to normal levels by any therapeutic means at our disposal.

It is probable that the tendency to bronchopneumonia and bronchiectasis in cases of pancreatic fibrosis is the result of changes in the bronchial epithelium due to vitamin A deficiency. I admit that this hypothesis is not entirely proved because of the conflicting experimental evidence as to the production of bronchiectasis on vitamin A deficient diets. There is strong clinical and pathologic evidence for it, however. Bronchiectasis was present in 15 of the 44 patients with cystic fibrosis of the pancreas who survived the first few weeks of life. In the autopsy records of the Babies Hospital since 1921, there are 17 cases of bronchiectasis in infants dying before the age of 1 year. The pancreas was sectioned in 8 of these cases, and in 7 the microscope reveals cystic fibrosis. These figures are startling and suggest that all young infants with bronchiectasis should be studied as possible cases of pancreatic disease. Older children with bronchiectasis of unknown etiology may also be observed with this in mind, although the steatorrhea of pancreatic insufficiency is not often overlooked in this age group.

It is interesting that there is but little evidence of deficiency of the other fat-soluble vitamins in association with cystic fibrosis of the pancreas. The osteoporosis which is often present may be due to deficiency of vitamin D or to failure to absorb calcium because it is bound as calcium soap to the fatty acids in the intestine. There is no evidence that vitamin K is deficient. No deficiency of the water-soluble vitamins has been found.

Some of the difficulties in the treatment of the disease have been made clear to us in the case of an infant who has been under observation since this summer. This baby was admitted last July at the age of 3 months with the complaint of loose stools and failure to gain. The parents and one older sibling are in good health. The patient appeared normal at birth, but has never done well. At one month he had a cold. He has always been fretful and irritable but has had a good appetite. On his admission at three months he was still at birth weight (Figs. 3 and 4). He appeared undernourished and wholly without subcutaneous fat, but his muscles were well developed. The abdomen was prominent, and the lungs were clear. On admission the diagnosis of pancreatic insufficiency was considered, and the duodenal juice was analyzed for enzymes on two occasions; none were found. He was

put on a formula composed of skim milk, banana powder, and casec. During his first three weeks in the hospital his weight remained nearly constant and then rose slowly. Soon after admission he developed a slight cough, which became worse, and after a month on the ward he began losing weight with alarming rapidity. The use of pancreas either raw or as powdered pancreatin was suggested. At first I rejected the idea on the grounds that the enzymes are destroyed by gastric juice, and the use of the necessarily large capsules presents great mechanical difficulties at this age. However, in desperation at the sight of his rapid weight loss, we mixed 1 gram of powdered pancreatin with each bottle of a whole evaporated milk formula just before feeding. This measure succeeded, to our surprise, and his weight increased from 3,700 to 4,700 grams in the following six weeks,

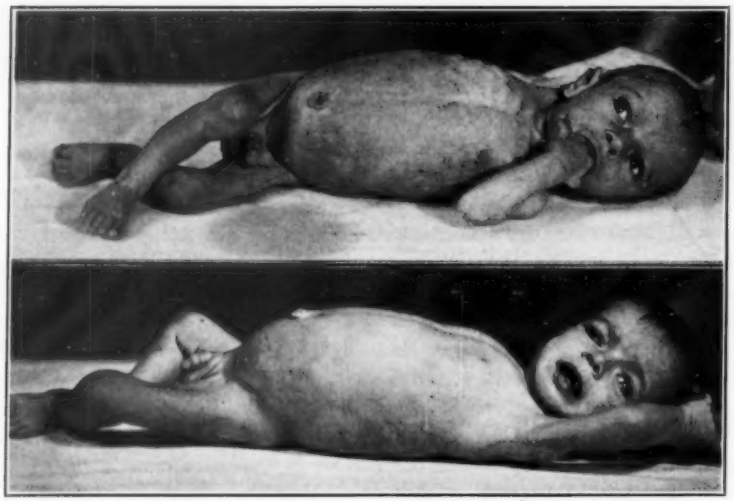

Fig. 3.—G. D. at 3 months of age.
Fig. 4.—G. D. at 6 months of age, after receiving pancreatin.

with two dips in the curve when the pancreatin was omitted for a few days. This led us to examine the gastric juice and to discover achlorhydria, which may account for the success of the pancreatin. Four analyses of the stools for fat have shown that on an evaporated milk formula the total lipids form about 60 per cent of the dried weight of the stool. On adding pancreatin the figure is decreased to 45 per cent. The effect of pancreatin is also indicated by the extent to which food fat is split. Without pancreatin 60-75 per cent of the total fat is present as fatty acids, but with it about 90 per cent is split. It is apparent that pancreatin has improved fat digestion and absorption without restoring them to normal. The total serum cholesterol has risen from 79 and 73 mg. per cent during his first weeks to 100-110 mg.

per cent but is still below normal. During his entire stay in the hospital the baby has received carotene parenterally, and large doses of vitamin A have also been injected, in addition to the usual amount of percomorph oil by mouth. Nevertheless, the cough has persisted and has recently increased somewhat. It is obvious that we still have much to learn about the treatment of the disease.

In summary, cystic fibrosis of the pancreas is a disease entity which may be diagnosed with probability on clinical grounds and proved by the assay of pancreatic enzymes in the duodenal juice. The clinical

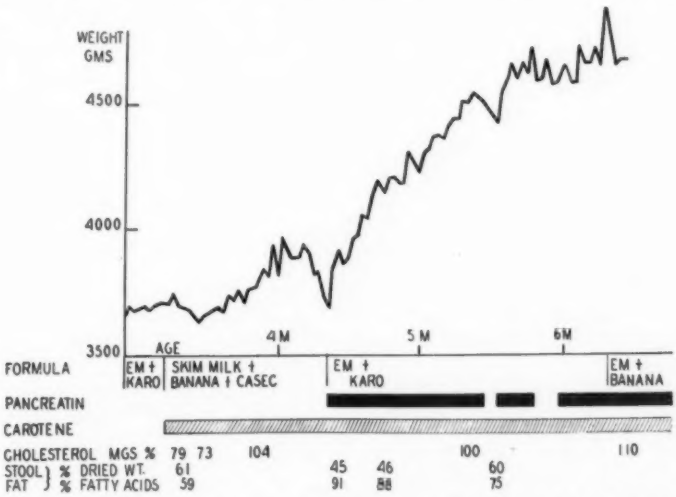

Fig. 5.—Weight curve of G. D., showing the relationship of the administration of pancreatin and carotene and the results of serum cholesterol and stool fat determination.

diagnosis may be strongly suggested on the basis of neonatal onset, large foul stools, failure to gain in the presence of a good appetite and adequate food, a tendency to repeated or chronic respiratory infections, and a history of similar disease in the siblings. All cases of bronchiectasis or xerophthalmia in infancy should be strongly suspected. Observations as to therapy are in their early stages. The best advice which we can give at present is to feed 20-40 per cent more than the estimated caloric requirement of a celiac diet modified by the use of whole milk mixed with pancreatin. Vitamin A should be administered consistently and generously.

In conclusion, I wish to express my sincere appreciation of the counsel, cooperation and continued interest of my colleagues of the Babies Hospital.

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THE ETIOLOGY OF RHEUMATIC FEVER

A Discussion

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THE etiology of rheumatic fever remains elusive despite the efforts of numerous investigators and a staggering volume of medical reports. It is difficult for one spending his entire time working on various aspects of rheumatic fever and rheumatic heart disease to digest completely and analyze critically the large volume of data appearing in medical journals. It would appear impossible for the physician, busy with the care of the patient, and for students, busy with a medical curriculum, to have the time available to become thoroughly familiar with this literature and to have available information or data which might help him criticize existing theories and hypotheses. For these reasons, a summary of the development of varied lines of thought relative to the etiology of rheumatic fever may serve some useful purpose. It is not possible to refer to many pertinent observations for such a report would assume monograph proportions, and much of the earlier work has long since served its usefulness in suggesting varied approaches to the solution of the problem. References will be included which will in turn give any interested persons a bibliography of rather broad proportions.

There are many factors which must be considered relative to the etiology of a disease. Rheumatic fever offers no exception to this. Of primary consideration is the question of specificity of the disease. Many have questioned that rheumatic fever is a disease entity. Some have questioned the specificity of the Aschoff body and have pointed out that some of the histopathologic findings in rheumatic fever are similar in type to those found, for instance, in rheumatoid arthritis. These are points of disagreement dependent upon individual interpretation of morphologic findings. There exists as yet no definite test which is diagnostic of rheumatic fever, and most students of the disease would agree that there is a strong probability that the disease has not been reproduced in experimental animals (Gross, Loewe, and Eliasoph[1]). Despite this there exists a series of clinical events which we must admit have many features in common, and investigators have in general agreed that rheumatic fever is a common, and apparently definite, disease entity. No one would deny that incidence statistics are relatively unreliable at present and may not be correctable until some specific diagnostic criteria are forthcoming.

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However, pathologists and clinicians have in recent years stressed the generalized nature of rheumatic fever. There are extensive changes throughout many tissues (Sacks[2]), and the clinical signs and symptoms may be protean. With wide variations, these patients have a number of factors in common, and the morbid anatomy is well known. The development of a clinical syndrome commonly known as rheumatic fever, or the development of heart disease of the rheumatic type, unquestionably represents what might be called a specific disease entity. It is merely the borderline cases that we are yet unable to classify. The mortality in groups of patients diagnosed by the above considerations varies from 20 to 25 per cent in different series and is further evidence that the disease is an entity, since the pathology of these fatal cases is strikingly consistent.

Further, there seems but little doubt that rheumatic fever is the expression of tissue response to an infectious agent or agents. The clinical signs and symptoms, nonspecific laboratory tests, and the pathology point strongly to this. Such a consideration would not conflict with the often expressed view that there exists a rheumatic diathesis. The problem, in this respect, is not unlike tuberculosis. Numerous reports indicate that the incidence of multiple instances of rheumatic fever and rheumatic heart disease in the same family is as high as is true in tuberculosis. The accumulation of accurate data concerning these features has only recently begun. The interpretation of the importance of hereditary susceptibility in comparison with possible communicability, as well as environmental influences, is little understood.

Wilson and Schweitzer[3] present a carefully observed group of patients and have analyzed their data with regard to environment, communicability, and heredity. These observers were unable to determin the exact role of environment and contagion in the acquisition of rheumatic fever, but strongly expressed the opinion that hereditary susceptibility would seem to determine the familial incidence of rheumatic fever. Read, Ciocco, and Taussig[4] with a smaller series report familial tendencies strongly corroborative of the study of Wilson and Schweitzer. They urge further study of the epidemiology of rheumatic fever and of the inherited predisposition.

Host factors are of great importance in relation to etiology, especially in determining the severity of an illness, but in infectious diseases the individual must either harbor an agent or come in contact with an agent capable of producing a series of events in the exposed person. In this respect, it is not inconceivable that an hereditary susceptibility may exist, and yet no disease result unless the patient comes in contact with the agent or agents actually responsible for the disease. The careful work of Paul and Salinger[5] on the spread of rheumatic fever through families may prove to be of additional value in indicating

the importance of factors other than, or in addition to, hereditary susceptibility. These authors noted the importance of respiratory infection in association with the spread of rheumatic fever through fifteen so-called rheumatic families.

Host factors other than the above have been frequently mentioned. Constitutional types and factors have been suggested but not convincingly reported. For many years dampness and poor housing have received frequent attention, especially in the English literature. While doubtless important, they cannot be considered as a substitute for an infectious agent. The recent report of Paul and Dixon[6] on the high incidence of rheumatic heart disease (4.5 per cent) among the Indian children in the cold though relatively dry climate of Wyoming and Montana, is of sufficient importance to make one seriously consider our lack of knowledge of the actual geographic distribution of rheumatic fever as well as some of the environmental factors. Endocrine dysfunction has been suggested but not actually studied.

Despite the importance of these varied factors in the problem as a whole, one must remember that Koch's postulates are still considered pertinent in consideration of the etiology of infectious diseases. Minor variations of the postulates may be necessary in special instances, but the more nearly they are complied with, the safer the hypothesis. The chief discussion in this report is relative to the consideration of rheumatic fever as an infectious disease, a specific entity, and as such an infectious agent or agents will be necessary in order to establish the etiology of the disease. Numerous agents have been suggested as the cause of rheumatic fever, and these agents have been suggested to cause the disease in various ways. Discussion of the individual suggestions are limited to references considered to be the most pertinent. Some clinical and natural history features of rheumatic fever will be mentioned as seem indicated. Suitable headings indicate the various theories concerning etiology.

STREPTOCOCCUS THEORIES OF THE ETIOLOGY OF RHEUMATIC FEVER

For nearly four decades the streptococcus has held the chief interest relative to the etiology of rheumatic fever. The suggestions have varied considerably both with regard to the type of streptococcus and the manner in which it may produce the disease. In general, there have been five theories, and these will be discussed under separate headings.

1. *Rheumatic Fever May Be Caused by a Generalized Bacteriemia.*—Poynton and Paine[7, 8] (1900) isolated a streptobacillus from the blood of eight patients with rheumatic fever (five at autopsy). Prior to this, several investigators reported the isolation of streptococci from the blood of rheumatic fever patients on rare occasions. Poynton and Paine may be considered as influencing subsequent work on rheumatic fever for a number of years. These observers performed a large number of studies,

experimental and clinical, and their work may be reviewed in a book which appeared in 1913. The streptococcus was thought to be specific and was designated as the *Diplococcus rheumaticus*. Numerous reports of the incidence of positive cultures in rheumatic fever patients—both blood and post-mortem cultures—began to appear in the literature. The streptococci so isolated varied considerably in both the type isolated and the percentage of positive cultures. It may be stated that, in a large number of reports relative to post-mortem cultures, most observers were able to obtain some type of streptococcus without too much difficulty. The strains isolated were usually of the viridans variety, less frequently of anhemolytic, and rarely of the hemolytic type. In 1929 Epstein and Kugel[9] pointed out that a high percentage of positive cultures may be obtained at necropsy, regardless of whether the examinations were made two or twenty-five hours after death. The beta hemolytic streptococcus was rarely encountered in these studies. These authors stress the unreliability of post-mortem cultures unless the same organism has been found during life.

There are wide discrepancies in the blood culture work, and an equally prominent group of investigators may be listed as finding no positive blood cultures in rheumatic fever, a relatively low percentage of positive cultures, and a very high percentage of positive cultures. The work of Callow[10] and of Wilson and Edmond[11] in 1933 has done much to clarify this confusion. Callow obtained positive results in 52 per cent of 367 cultures on 174 rheumatic fever patients. Seventy per cent of a control group with acute upper respiratory infection were positive, and 8 per cent were positive in normal, healthy young adults. Wilson and Edmond obtained 46 per cent of positive cultures from 67 rheumatic fever patients and 54 per cent of positive cultures from individuals with upper respiratory infections. In 30 miscellaneous febrile diseases, 50 per cent had positive blood cultures. These observers discussed the technical aspects relative to obtaining positive blood cultures. The results of these studies have minimized the importance of blood cultures in rheumatic fever chiefly for two reasons: (1) any ill patient may have a positive blood culture if the search is intensive; and (2) infection of the upper respiratory tract is common at the onset of rheumatic fever, and this in itself is commonly associated with at least a transient bacteriemia. Again it should be stressed that the beta hemolytic streptococcus was rarely isolated.

The most definite objection to a generalized bacteriemia as the cause of rheumatic fever is the failure of the experimental work to result in the reproduction of the disease. Many reports of lesions strikingly similar to those of rheumatic fever may be found, but in none has the histologic evidence been generally accepted. The criticisms of Gross, Loewe, and Eliasoph[1] are again referred to. The chief experimental

lesions produced have been suppurative arthritis and bacterial endocarditis. These lesions are obviously different from those seen in human rheumatic fever.

2. *The Toxic Theory.*—In 1927 Small[12] reported the isolation of an anhemolytic streptococcus from the blood of a rheumatic fever patient. These organisms were later abundantly found in the pharynx. The saline extracts of this organism were used in skin testing rheumatic fever patients, and reactions very similar to the Dick reaction were noted. The organism was called *Streptococcus cardioarthritidis.* It was concluded that the organism was a toxin producer, and strongly suggested that rheumatic fever was the result of this toxin. Suggestive experimental lesions were produced in rabbits with this organism, and antiserum was prepared. Favorable results were reported with this antiserum in the treatment of patients with rheumatic fever. These beneficial results were not corroborated. The subsequent discussion of the allergic hypothesis covers most of the objections to this theory.

3. *The Allergic Hypothesis.*—Some years ago Swift[13] pointed out the similarity of the manifestations of rheumatic fever with those of tuberculosis and syphilis, and soon afterward similar views were expressed by Bezancon and Weil[14] in France. The basic point of similarity is the type of the histopathologic lesion, a granulomatous reaction in each instance. In tuberculosis and syphilis there is strong evidence of the allergic nature of the lesion. Zinsser and Grinnell[15] succeeded in producing severe allergic reactions in guinea pigs with streptococcus and pneumococcus substances. The allergic hypothesis has been completely discussed by Swift, Derick, and Hitchcock[16] and by Zinsser and Yu.[17] In Germany, Klinge[17a] has conducted a volume of experimental studies relative to tissue changes as a result of hypersensitivity.

Much of the validity of the allergic hypothesis was dependent upon the high percentage of positive skin reactions to the products of streptococci in rheumatic fever patients, and the ease with which animals (chiefly rabbits and guinea pigs) may be sensitized to streptococcus products. Birkhaug[18] isolated an anhemolytic streptococcus from the throats of rheumatic fever patients that had many points of similarity to the organism used by Small in the development of his toxic theory. Broth filtrates of this organism gave positive skin reactions, some of which could be neutralized. This was verified by Kaiser,[19] and later by Swift, Wilson, and Todd,[20] and by Irvine-Jones.[21] These latter workers used additional types of streptococci, with comparable results. Control groups as reported had a much smaller percentage of positive skin reactions than did rheumatic fever patients. The actual control of such a problem offers very real difficulties.

Gibson and Thomson[22] (1933) skin tested a group of 266 rheumatic fever children and 264 children with other diseases. These groups were of comparable age and from identical living conditions, and had

a similar opportunity of contact with streptococcus infections. The percentage of positive skin reactions in these two groups showed but little difference. In none of the control groups did rheumatic fever develop. This is perhaps the most important report, since the control group was more nearly comparable to the rheumatic fever group. This work is very similar to our experience, in that control groups closely approximated the skin reactions of the rheumatic fever group if the opportunity of streptococcus infection was relatively similar. It is now generally conceded that the reaction to the intradermal introduction of an antigen denotes that the tissues have previously come in contact with the antigen. Thus, persons having frequent streptococcus infections, especially children, may be expected to exhibit positive skin reactions to streptococcus products.

In the animal experimentation relative to the allergic hypothesis, no lesions resulted which were interpreted as being similar to the pathology of rheumatic fever. Studies were conducted concerning the influence on the incidence of recurrences of rheumatic fever of intravenous vaccination with streptococci (Wilson, Josephi, and Lang[23]). This method of immunization or desensitization failed to produce any satisfactory therapeutic results.

A severe criticism of this theory is that it has been demonstrated that animals and rheumatic fever patients may be sensitive to streptococcus products or are capable of becoming so sensitive. They also may be desensitized to the products of streptococci, but no closer link has been demonstrated between streptococcus sensitivity and rheumatic fever.

4. *Subclinical Scurvy With Superimposed Bacterial Infection.*—Rinehart and Mettier[24] (1934) reported the production of interesting changes in the heart of the guinea pig as the result of combined scurvy and infection. The lesions were degenerative and proliferative in type and occurred in the heart valves, the muscle, and the pericardium. These authors suggest that the lesions may be considered similar in type to the Aschoff reaction. More recently Rinehart[25] has suggested that the geographic distribution and epidemiology appear entirely consistent with a thesis implicating a factor of vitamin deficiency with the etiology of rheumatic fever.

That lesions similar to those described by Rinehart may be produced as described has been corroborated by Stimson, Hedley, and Rose,[26] by Schultz,[27] and by McBroom, Sunderland, Mote, and Jones.[28] Varied streptococci may be used for the infectious factor. Schultz reported that minimal lesions could be found in control animals. McBroom, Sunderland, Mote, and Jones reported that lesions of a similar nature were obtained in total scurvy without superimposed bacterial infection. This has not been definitely corroborated. Infection is known to increase scurvy, and it is possible that the lesions described may be the

effect of scurvy on the guinea pig heart, a state of total scurvy being produced by the superimposed infection.

The metabolism of vitamin C in rheumatic fever patients has been studied by Sendroy and Schultz,[29] by Abbasy, Hill, Gray, and Harris,[30] and by Rinehart, Greenberg, Olney, and Choy.[31] There seems to be general agreement that studies of the urinary excretion and the blood plasma content indicate that without increase in the intake of vitamin C, one must expect a decided alteration of its metabolism in rheumatic fever patients. This is most easily explainable on the basis of increased vitamin C utilization as a result of infection, rather than indicating etiologic or predisposing significance. An increased need for vitamin C does exist in rheumatic fever patients, but it is not yet proved that a deficiency in vitamin C intake is more deleterious in rheumatic fever than in other infectious processes.

5. *The Role of the Hemolytic Streptococcus.*—For many years observers have noted the frequency with which rheumatic fever patients have tonsillitis at or near the onset of their disease or its recurrence. In a monograph, published in 1931, Coburn[32] presented the first of a long series of observations relative to the hemolytic streptococcus and rheumatic fever. Attention was first directed to a possible relationship because of the frequency with which Puerto Ricans developed scarlet fever or hemolytic streptococcus tonsillitis and pharyngitis soon after arrival in New York—in many instances to be followed by rheumatic fever. Scarlet fever and rheumatic fever were known to be rare in Puerto Rico, and this sequence of events seemed striking. Upon careful study of the throat cultures of ambulatory rheumatic fever subjects in New York, Coburn became impressed with the frequency with which hemolytic streptococcus infection preceded the onset of rheumatic fever recurrences. A group of eleven patients ill with rheumatic fever were transported to Puerto Rico in 1929, and within three months of the time of arrival, rheumatic fever became inactive. There was a noticeable absence of hemolytic streptococci in the throat cultures while the patients were in Puerto Rico. Upon returning to New York, some of these patients developed hemolytic streptococcus respiratory infection and recurrent rheumatic fever. Immunologic studies were undertaken, and subsequently the development of a significant antistreptolysin titer was considered of importance. As the result of studies presented in 1932, Coburn[33] concluded that "the relationship between the incidence of hemolytic streptococcus and the geographical distribution of rheumatic fever, the relationship between the recrudescence in the rheumatic subject and infection of the throat with hemolytic streptococcus, the development of immune bodies for hemolytic streptococcus at the onset of the rheumatic attack and the apparently specific relationship of antistreptolysin formation to infection with hemolytic streptococcus—to-

gether this combined evidence indicates that the infectious agent initiating the rheumatic process is *Streptococcus hemolyticus.*"

Coburn[34, 35] also reported the occurrence of an influenza epidemic in an isolated group of children with heart disease. No rheumatic fever recurrences resulted. Following this an epidemic of *Streptococcus hemolyticus* respiratory infection occurred in the same group. Fourteen of seventeen children having the hemolytic streptococcus infection developed recurrent rheumatic fever. The hemolytic streptococci were of a single type and were strong toxin producers. In all fourteen instances of recurrent rheumatic fever, a rise in antistreptolysin titer occurred coincident with the onset of rheumatic fever symptoms. Seven rheumatic children who escaped infection with the hemolytic streptococcus failed to develop an antistreptolysin response and had no recurrent rheumatic fever. Another series of reports concerned chiefly the characteristics of the strains of hemolytic streptococcus, effective and noneffective in initiating rheumatic activity, and the significance of antistreptolysin in the development of rheumatic activity. It was concluded that rheumatic disease is the result of the following series of events: "(1) Infection with toxin-producing strains of hemolytic streptococcus initiates a process peculiar to rheumatic subjects; (2) in the course of this process a substance is released, presumably from the antibody-producing tissues, which either directly or indirectly alters mesodermal structures. This substance is probably not the infecting organism, and at the present time there is no evidence to suggest that it is viable. (3) The release of this toxic substance seems to take place only when there is an immune response to hemolytic streptococcus."

Further data[36] suggest that in the rheumatic fever subject there is a delay in the development of the antibody response.

To evaluate so tremendous a volume of important work is in itself a stupendous task. One must not only know the disease rheumatic fever, but one must be familiar with streptococcus immunology in rheumatic fever and a wide range of streptococcus infections, as well as varied control groups living under known conditions. The fundamental problem involved is to determine any difference in response to hemolytic streptococcus infection of various types between the rheumatic and nonrheumatic individual.

Wilson and her associates[37, 38, 39] have made the only other extensive study at present in the literature relative to the hemolytic streptococcus and rheumatic fever. Wilson does not feel that her studies support the assumption that a rise in antistreptolysin titer of the serum is conclusive evidence of streptococcal respiratory infection. Further, a rise in antistreptolysin titer is not a necessary accompaniment of rheumatic fever in children. The data as presented by Wilson do not support Coburn's studies. The incidence of hemolytic streptococcus pharyngitis or tonsillitis in association with recurrent rheumatic fever is low. Es-

pecially is this true of recurrences in which the respiratory infection occurs from ten to fourteen days prior to the onset of rheumatic fever. Wilson states that respiratory infections in a rheumatic child may bear no more specific etiological significance than would be attributed to similar episodes occurring in the tuberculous child.

In a large series of studies concerning hemolytic streptococcus infection and rheumatic fever, we have been impressed with the close clinical association, as well as the immunological response, in patients with either the first attacks of rheumatic fever or with recurrent rheumatic fever. The clinical features of this study have already appeared in the literature,[40] but the immunological data[41] are yet to appear. We have been especially interested in separating the rheumatic fever patients into those having their first attack of rheumatic fever and those patients judged to have no active rheumatic fever, but in whom there occurred events often observed to be associated with recurrent rheumatic fever. Little could be learned from patients having active rheumatic fever for obvious reasons, chiefly (1) the severity of a disease may be easily increased with little or no exciting stimulus and (2) many patients with active rheumatic fever already have an elevated antistreptolysin titer, and it is difficult under such circumstances to be sure of an immune response.

In our experience, 58 per cent of patients observed during what appeared to be their initial attack of rheumatic fever had an associated respiratory infection. In approximately two-thirds of these the infection was a symptomatic sore throat. The rise in antistreptolysin titer in these patients closely approximated the antistreptolysin rise in nonrheumatic individuals with known streptococcus diseases, scarlet fever, and upper respiratory infection. This antibody response occurred regardless of whether respiratory infection was associated with the onset of the disease or not.

Approximately 50 per cent of all rheumatic fever subjects without the active disease develop recurrent rheumatic fever if they have symptomatic sore throats. About one-third of these subjects having colds also develop recurrent rheumatic fever. In our series, the symptoms of rheumatic fever began within one week of the onset of the respiratory infection in about 50 per cent of the observed instances. In only 25 per cent of the observed recurrences was the ten-to-fourteen-day silent period observed. This has been commonly referred to by Coburn, and doubtless is responsible for the frequency with which the onset of rheumatic fever symptoms and the development of an immune response occur simultaneously. This also may be a point of difference in analysis between the reports of Coburn, Wilson and co-workers, and ourselves.

Of 271 observed recurrences of rheumatic fever, two-thirds were associated with infections of the respiratory tract, while one-third were apparently spontaneous. In a small number the recurrence of rheumatic

fever was apparently associated with nonrespiratory tract infections or trauma. No significant differences could be detected between the nonrheumatic and the rheumatic in antibody response to hemolytic streptococcus products as a consequence of streptococcal infections or rheumatic fever attacks. The immunologic data to be published suggest the importance of streptococcus infections of the respiratory tract in association with rheumatic fever even in the absence of clinical evidence of such infection. There was also suggestive evidence that mild or moderately severe rheumatic fever may occur in persons with inactive rheumatic fever in the absence of both clinical and serologic evidence of associated streptococcal infection. It is pertinent that no significant difference could be detected, by the methods used, between the nonrheumatic and the rheumatic individual in his antibody response to hemolytic streptococcus infection. Further, no difference could be detected between the rheumatic and the nonrheumatic individual with regard to the persistence of hemolytic streptococcus antibodies or in the type of antistreptolysin curve which results from such infection. It is evident that we are aware of the close association between rheumatic fever and hemolytic streptococcus infection. However, hemolytic streptococcus infection would not seem to be the only important factor relative to the etiology of rheumatic fever.

PLEUROPNEUMONIA-LIKE MICROORGANISMS AS THE POSSIBLE CAUSE OF RHEUMATIC FEVER

During the past few years a good deal of attention has been given to a group of microorganisms which seem to fall midway between bacteria and viruses. Ledingham[42] has written about their association with agalactia. Klieneberger[43, 44] has studied these microorganisms carefully, especially relative to their close association in cultures with the *Streptobacillus moniliformis*. They have been generally referred to as "L" organisms. There exists considerable disagreement as to whether these "L" organisms represent a variant or growth phase of the streptobacillus or a symbiont. Dienes[45] has carried out pertinent observations in relation to cultural characteristics.

Sabin[46, 47, 48] isolated a strain of this organism from toxoplasma-infected brain tissue of a mouse. Later it was obtained from the brain of one normal mouse. This "L" organism was capable of producing an endotoxin and a series of neurological events in mice upon intravenous inoculation. This syndrome was suggestive of chorea. An arthritis was also produced in mice when the organism isolated from the brain of a normal mouse was injected intravenously or intraperitoneally. These joint changes were suggestive of human rheumatoid arthritis.

It was recently reported by Swift and Brown[49] that they had isolated pleuropneumonia-like microorganisms from the tissues and exudates of rheumatic fever patients. Lesions were obtained when this rheumatic

fever material was placed on the chorio-allantoic membrane of the chick embryo. Etherized mice were inoculated intranasally with rheumatic exudates and with suspensions of chorio-allantoic membranes. The mice developed pneumonitis. It was possible to grow in subcultures the pleuropneumonia-like microorganisms from pneumonic mouse lungs and from the abnormal chorio-allantoic membrane. It was suggested that these microorganisms were obtained from the rheumatic fever material, rather than the mouse lungs. It was not stated that these microorganisms were the etiological agent in rheumatic fever, but interest became great.

In a more recent report, Swift and Brown[50] indicated that evidence now strongly suggests that these microorganisms were grown from mouse lungs, that the growth on media direct from rheumatic fever material or inoculated chorio-allantoic membranes was an artifact. However, there seems a definite stimulus to growth of the "L" organism when rheumatic fever materials are inoculated into the mouse. Sabin[51] stated that there was no direct evidence pointing the association between these microorganisms and either rheumatic fever or rheumatoid arthritis.

THE POSSIBLE VIRUS ETIOLOGY OF RHEUMATIC FEVER

That rheumatic fever may be due to a filtrable virus is not a new conception. Many authors have for years referred to the unknown causative agent as the virus. As long ago as 1912, DeVecchi[52] suggested that he obtained significant myocardial lesions in animals as the result of inoculation with serum and blood from rheumatic fever patients. Natali[53] in 1923 reported similar observations in rabbits. Miller[54] (1924) failed to corroborate these results, finding rather similar lesions in control rabbits. Gross, Loewe, and Eliasoph[1] reported the unsuccessful attempts to reproduce the disease, using a wide variety of material and varied animal species. In our own laboratory we have conducted studies over a period of years relative to the possible virus etiology. Varied animals have been used, various rheumatic fever materials, and inoculations were made in varying ways and under various conditions. On the whole, this has been unsuccessful. With Hubbard,[54a] we have unsuccessfully attempted to cultivate viruses from rheumatic fever material, using the chorio-allantoic membrane of the chick embryo. Various immunologic tests also failed to produce evidence of a virus in rheumatic fever patients.

In 1935 Schlesinger, Signy, and Amies[55] reported the finding of particles in exudates of rheumatic fever patients. These particles were obtained by high speed centrifugation of the exudates and were visible by dark-field examination. They appeared to be similar to the elementary bodies observed in known virus diseases. Suspensions of these bodies were specifically agglutinated by the sera of patients re-

covering from rheumatic fever. This work was further extended by Eagles, Evans, Fisher, and Keith.[56] These elementary-like bodies were from varied rheumatic fever, rheumatic arthritis, and chorea materials. Cross-agglutination occurred within the whole group, and with sufficient regularity to point to an interrelationship and hypothecate for rheumatoid arthritis and chorea, a possible virus etiology similar to that of rheumatic fever. It is disappointing that these same observers[57] were unable to obtain successful animal experiments. Van Rooyen[58] disagreed with the significance of the finding of these bodies and was unable to corroborate the agglutination tests. Further, he injected the bodies under the skin of rheumatic and nonrheumatic subjects without any resulting change. We have frequently observed these bodies in the high speed centrifugate of rheumatic fever exudates, but bodies of apparently the same size may be obtained from most body fluids of nonrheumatic sources. In addition, we encountered great difficulty in the agglutination tests and were unable to corroborate any specificity. Recently Eagles and Bradley[59] have again corroborated the agglutination reactions, but found positive agglutination tests with sera from "unrelated arthropathies," which they felt raised the question of the component parts of the reaction.

It may be well to mention briefly some further virus work which has been in progress at the House of the Good Samaritan. These have been reported by Mote and Jones,[60] and will soon appear in the literature in more detailed form. Serial intranasal passage in mice of tissue and exudates from nine rheumatic fever patients was carried out in 1938. In five instances a filtrable virus was isolated. Severe pneumonitis resulted in the inoculated mice. These virus were apparently isolated from myocardial tissue and pericardial fluid, but the technique used at the time did not exclude contamination with lung tissue. In 1939 tissues and body fluids from ten rheumatic fever patients were similarly used. In only one instance was a virus isolated, and that from the lung. This virus was isolated by one of our associates, Dr. R. D. Baird. In no instance was a virus strain directly isolated in ferrets from human tissue.

Serial passage of normal mouse tissue through several strains of mice revealed no latent virus. In a large number of other serial passages of human tissue in these mouse strains, no latent mouse virus was detected. Hence, it was felt that the isolated viruses originated from the human tissue injected. The exclusion of the possibility of the mouse origin of viruses is a difficult problem.

Extensive studies of the virus strains isolated in this laboratory indicate that they have properties consistent with human influenza. In addition, cross-neutralization and cross-immunity tests between these strains and the P-R 8 strain of human influenza reveal a close relationship. Neutralization tests with the sera of rheumatic fever patients

indicate that a number of them neutralize both the P-R 8 human influenza strain and the virus strains isolated in our laboratory. This may be a coincidental finding, and is not yet completely evaluated. No direct correlation between the presence of these virus strains—or antibodies to them—and rheumatic fever has been demonstrated.

CONCLUSION

A general and critical analysis of theories relative to the cause of rheumatic fever have been briefly reviewed. It seems unnecessary to add that the cause of rheumatic fever remains unknown. This report suggests the continuation of several approaches to the problem. Especially needed are studies relative to possible hereditary susceptibility and epidemiology. Hemolytic streptococcus and virus studies, in fact, general studies of respiratory infection, are clearly indicated as the result of recent work in rheumatic fever.

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THE DIAGNOSIS AND THE EFFECTS OF LIGATION OF THE PATENT DUCTUS ARTERIOSUS

A Report of Eleven Cases

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THE feasibility of terminating the abnormal arteriovenous flow of blood in patients with persistence of the ductus arteriosus has interested physicians since it was first seriously advocated by J. C. Munro[1] in 1907. In May, 1938, Graybiel, Strieder and Boyer[2] reported an unsuccessful attempt to ligate a patent ductus in a patient with subacute bacterial endarteritis. The first successful ligation was performed by Gross and Hubbard[3] in August, 1938. We will report the findings and the effects of ligation in eleven cases of patent ductus arteriosus. We also have under our care, and have carefully studied, nine other patients with typical findings.

PROGNOSIS

The prognosis in this condition without operation is relatively good from the pediatrician's point of view but is poor from the standpoint of the cardiologist who follows the patients in later life. The majority will live beyond the age of 12 years but eventually will die of their heart lesion. Dr. Maude Abbott,[4] in her exhaustive analysis of congenital heart disease, has collected 92 cases of patent ductus Botalli. The mean age of death in these was 24 years. This series includes, however, 20 patients who died in infancy. The relatively high mortality in infancy cannot be considered as affecting the prognosis in those who live beyond this age and in whom ligation of the ductus might be considered. The exact cause of death in infancy is often not clear. Neither is it always discernible in infants that the patency is abnormal for the age. Bacterial endarteritis rarely if ever occurs in infancy; if infants are included in a series, the hazard of this complication in later life is made to appear less important than it actually is. In other words, it is only by eliminating these cases from the series that the hazard of bacterial infection, at an age when surgical intervention would normally be considered, can properly be estimated.

In order to determine the expectation of life without operation we have reviewed the original reports of 76 cases from the literature. We have limited ourselves to the cases in patients over the age of 3 years proved by autopsy to have no other significant cardiac anomaly.

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Every such case available to us in the literature has been included. To this we have added four like cases from the Los Angeles County Hospital, which have not been previously reported.

The age at death and the cause of death in these 80 cases are shown in Chart 1. By the age of 14, eleven (14 per cent) of the patients had died from their heart lesion. By the age of 30 years, one-half were dead; by the age of 40 years, 71 per cent were dead. Two lived to the age of 66 years. The onset of symptoms was, of course, earlier, and the chart does not show the often prolonged periods of incapacity.

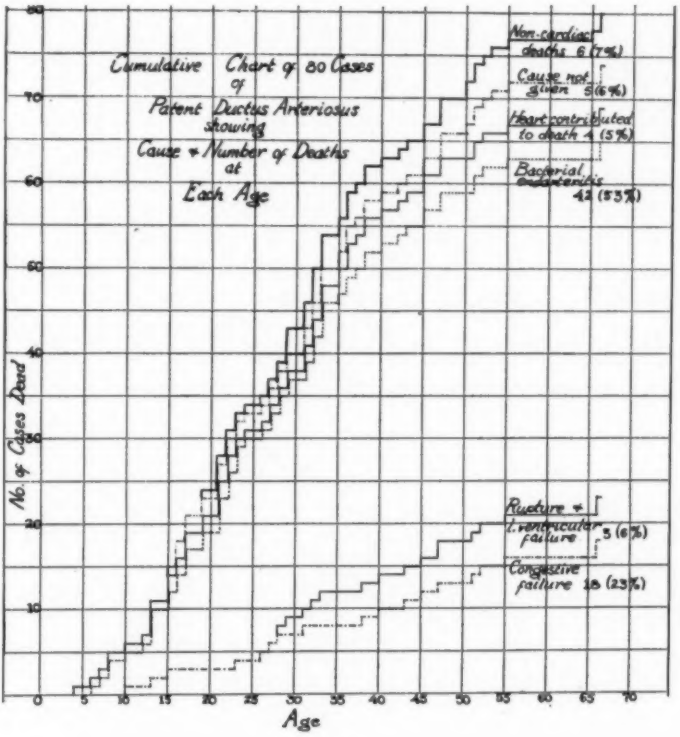

Cumulative Chart of 80 Cases of Patent Ductus Arteriosus showing Cause + Number of Deaths at Each Age
Non-cardiac deaths 6 (7%)
Cause not given 5 (6%)
Heart contributed to death 4 (5%)
Bacterial endarteritis 42 (53%)
Rupture + l. ventricular failure 5 (6%)
Congestive failure 18 (23%)
No. of Cases Dead
Age
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70

Chart 1.

Eighteen patients (23 per cent) died of congestive failure,[5-22] five (6 per cent) of rupture of the ductus or left ventricular failure;[23-27] forty-two (53 per cent) of bacterial endarteritis;[28-69] and in four (5 per cent) there was an associated cause of death,[70-73] but the heart lesion was obviously an important factor. Thus 69 persons (86 per cent) died as the result of the congenital lesion. In five patients[74-78] the cause of death was not given, although presumably some of these died from their heart lesion. Six (7 per cent) died from other causes.[79-84]

The references are listed in the order of the age of death under each cause of death. It is thus possible to determine from the cumulative table (Chart 1) the age of each patient included. The cases of Chevens[85] and Caylor[86] were omitted because the exact age was not given. The cases of Summons[87] and Thomson and Drummond[88] in which death occurred in the third year of life are not included. Because of associated lesions we have excluded certain cases with a patent ductus.[89-93] In fourteen of our cases[6, 7, 10, 12, 24, 25, 34, 35, 41, 43, 45, 46, 79, 83] there were other minor associated anomalies. With four possible exceptions[6, 7, 46, 83] where there was some constriction of the aorta near the entrance of the ductus, these lesions did not seem to contribute significantly to the cause of death and would not have contraindicated ligation of the ductus.

This series is influenced by factors which affect the reporting of cases. The cases in the older patients are more likely to be recorded because of an apparent competitive interest in reporting deaths at an advanced age from a congenital lesion. Cases with bacterial endarteritis are reported because of great interest in this disease. There are undoubtedly many autopsy series which include one or more cases of uncomplicated patent ductus which have not been reported. Lack of recognition of the paucity of material available in the literature has undoubtedly contributed to this omission. There is an urgent need for the recording of unselected cases from autopsy series.

ASSOCIATED DEFECTS

The possibility of a patent ductus' being associated with another lesion, as a compensatory phenomenon, must be seriously considered. It has at times been thought to be usually associated with other lesions. In considering this problem, we investigated the frequency of patent ductus among 21,000 autopsies at the Los Angeles County Hospital (Table I).

TABLE I

PATENT DUCTUS ARTERIOSUS AMONG 21,000 AUTOPSIES

Congenital heart disease		133
Patent ductus arteriosus		36
With other defect:		
Before 9 mo.	20	
At 2½ yr.	1	
Over 3 yr.	0	
		21
Uncomplicated:		
Less than 2 mo.	10	
Four mo.	1	
Over 3 yr.	4	
		15

In this series there were 133 cases of congenital heart disease. Among these there were 36 cases of patent ductus arteriosus. In 21 of this group patent ductus arteriosus was associated with other defects in the heart, but 20 of the patients died before the age of 9 months. The only patient with an associated cardiac anomaly who lived more than 9 months was a cyanotic child, with the tetralogy of Fallot, who died at 2½ years. Ten infants with uncomplicated patent ductus were less than 2 months in age. This group depends entirely upon the interpretation of the size of the ductus at this age in relation to the normal and the personal tendency of the pathologist to list or omit an anatomically patent ductus which may be a normal finding. One uncomplicated case resulted in death at the age of 4 months. Of the remaining 4 patients with uncomplicated patent ductus arteriosus, 2 died of congestive heart failure at the ages of 10 and 38 years, and the other two died of bacterial endarteritis at the ages of 33 and 37 years.

Every patient with patent ductus who lived past infancy finally died as the result of the congenital lesion. None of the four patients with patent ductus who lived beyond the age of 3 years had associated anomalies. This again illustrates the fact that age groups must be considered and that statistics based purely upon anatomical studies do

TABLE II

CONGENITAL CARDIAC ANOMALIES ASSOCIATED WITH PATENT DUCTUS ARTERIOSUS
(FROM ABBOTT'S ANALYSIS OF 1000 CASES)

	NUMBER OF CASES
Incompatible with life beyond infancy	
Premature closure of foramen ovale	3
Absence of aortic arch	3
Infantile coarctation	7
Mitral atresia	2
Productive of cyanosis	
Truncus arteriosus	2
Transposition of great vessels	41
Pulmonary stenosis	12
Pulmonary atresia	28
Aortic atresia	10
Complete defect of septum	11
Tricuspid atresia	6
Easily recognized	
Displacement of the heart	17
Heart block	3
Coarctation of the aorta	6
Right aortic arch	5
Left subclavian from ductus arteriosus	1
Pulmonary artery forms descending aorta	6
Not contraindicating operation	
Anomalous septa	3
Defects of the interauricular septa	1
Defect of the interventricular septum	3
Pulmonary insufficiency	1
Aortic stenosis	4
Anomalous cusp	4
Mitral stenosis	3
Double aortic arch	2
Anomaly of pulmonary veins	1

not necessarily apply to a clinical problem. We feel that, if we exclude cases in infants and cases with cyanosis, the probability of a patent ductus being associated with other significant anomalies is relatively small. Certain associated anomalies, such as patent foramen ovale, patent interventricular septum, or bicuspid aortic valves, could be associated without changing the indications for ligating the ductus. The increased strain placed upon the heart and great vessels would be the same with these anomalies present as when they are absent.

In order to illustrate the problem of complicating lesions we have listed (Table II) all instances in Abbott's summary[94] of 1,000 cases of congenital heart disease in which a patent ductus was a complication of another lesion. It is evident from the chart that lesions in which the flow of blood through the ductus is a compensatory phenomenon, such as aortic or pulmonary atresia, will produce cyanosis. The lesions, which would be difficult to recognize, would not contraindicate ligation. With careful examination other lesions, such as coarctation of the aorta, should be easily recognizable. Ligation of the ductus, however, would not prevent the possibility of bacterial endocarditis developing on such an associated lesion.

SYMPTOMS AND PHYSICAL FINDINGS IN PATIENTS OPERATED UPON

The ages of the eleven patients upon whom we have operated were from 4 to 31 years (Table III); four were males, and seven were females. The second patient was born at seven and one-half months, the eighth at seven months, and the others at term. The onset of dentition, walking and talking was normal. Menses first appeared at 17 in one (Case 7).

All except the youngest had had the common diseases of childhood. None had had rheumatic fever or chorea. The first patient had undescended testicles and webbing between the toes. There were no other apparent associated developmental defects. The fourth patient had a spastic paralysis of the arms from a birth injury, and the seventh had a lung abscess at 13 years. In the tenth patient frequent attacks of bronchial asthma had been apparent since early childhood. There was no family history of heart disease or congenital defects.

None of these patients was cyanotic. In only one (Case 1) was there a history of transient cyanosis, two years before operation, at the time of a severe cough due to acute bronchitis. A heart lesion was discovered at birth in three, early in infancy in four instances, and between the ages of 3 and 5 years in the others.

Two of the patients (Cases 5 and 11) had had no symptoms but both had definite enlargement of the heart as shown by roentgenogram. The tenth patient had no symptoms which could be distinguished from the frequent attacks of bronchial asthma. The other eight patients had been on a restricted regime, avoiding strenuous activity. They were comfortable at rest but complained of palpitation,

TABLE III

CASE	1	2	3	4	5	6	7	8	9	10	11
Age (yr.)	13	13	13	11½	4	6½	31	11½	9½	19	8
Sex	M	M	F	F	F	M	F	M	F	F	F
Murmur discovered	5	7 mo.	Birth	16 mo.	4	4	Birth	Birth	3	6 mo.	1 yr.
Fatigue	+	+	+	+	0	+	+	+	0	0	0
Dyspnea	+	0	+	0	0	+	+	+	+ sl.	Asthma	0
B.P., at rest	136/0	135/50-20	135/50-25	105/65	120/40-0	125/50-0	125/80	120/40	120/60	142/60	120/55
B.P. during anesthesia	180/0	140/50	180/0	130/35	120/0	120/0	160/120	130/0	170/0	150/56	140/40
B.P. after ligation	152/90	150/90	180/80	135/60	120/75	120/65	150/140	125/80	152/65	156/96	150/110
B.P. on discharge	130/70	130/75	125/75	115/75	120/75	105/70	130/75	120/70	120/70	120/78	120/82
Thrill Ics.	2nd	3rd	2nd	0	2nd	2nd	2nd	2 D	2 exp.	2nd	2nd
Increased P2	Obscured	Obscured	+	+	+	+	Obscured	+	+	+	+
Murmur	Loud rough	Loud roar	Loud rough	Slightly rough	Loud roar	Soft blow	Moderately loud	Loud roar	Mod. roar	Loud roar	Loud whirr
Murmur maximum Ics.	2nd	3rd	2nd	1st	2nd	2nd	2nd	2nd	2nd	2nd	2nd
Accentuated	D	Late S and early D	D	Late S and early D	Late S and early D	Late S and early D	S	D	Late S and early D	D	S and D
D at apex	+	+	+	0	+	0	0	+	+	+	+
Q_3	+	+	+	+	0	+	0	+	+	+	0
Notch R_1	+	0	+	0	0	0	0	0	0	0	0
Depressed $S\text{-}T_{2 \text{ and } 3}$	0	+	0	+	+	0	0	1 and 2	0	0	0
Date operation	3/28/39	4/27/39	5/6/39	5/15/39	6/8/39	6/17/39	6/29/39	7/13/39	10/9/39	10/10/39	10/24/39
Murmur on last exam.	Soft S	Soft S	Late death	0	0	0	Mod. S	0	S	Soft sys.	Soft sys.

D—diastolic. S—systolic. Ics—intercostal space. P2—pulmonary second sound. Q, R, S-T refer to waves in electrocardiogram in respective leads.

weakness, and ease of fatigue, and they were unable to keep up with the activities of normal children. Six of these also complained of dyspnea on exertion. The third patient had a fainting attack one week before admission. The seventh patient had had frequent attacks of tachycardia and dyspnea for seven years; dyspnea on exertion had increased for ten months; and she had been confined to bed for one month. The eighth patient had been admitted to the hospital on two occasions for severe epistaxis. None of the patients had had congestive failure or edema.

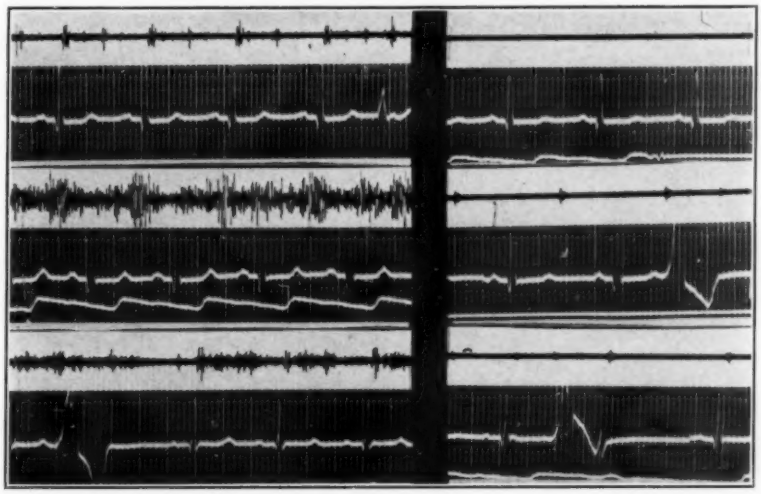
Except for the well-nourished 4-year-old child they were all rather slim, though none remarkly so. Pallor was not striking in any one, and none showed clubbing or edema.

All except one patient (Case 7) showed a high pulse pressure with low diastolic blood pressure. The diastolic pressure was often difficult to measure exactly, there being no sharp point which could be read with certainty. It also varied markedly with activity and under varying conditions. Two patients had a typical Corrigan pulse (Cases 1 and 6). Five patients (Cases 1, 5, 6, 8, and 9) had a pistol shot sound over the femoral artery which was more prominent after exercise. As pointed out by Bohn,[95] exercise caused a marked increase in pulse pressure with a drop of the diastolic pressure, often to zero. Even excitement tended to cause a lowering of the diastolic pressure. Induction of anesthesia tended to cause a lowering of the diastolic and, at times, a rise in the systolic pressure. The ninth patient had a blood pressure of 120/60 mm. before and 170/0 after induction of anesthesia. In Case 7, however, both exercise and anesthesia caused a rise of systolic and diastolic pressure. A careful search was made in order to exclude coarctation of the aorta, and no patient showed a lowered blood pressure in the legs, decreased oscillometric pulsation in the legs, collateral circulation outside the chest, or erosion of the ribs on roentgen examination.

A palpable thrill was present in all except the fourth patient, although in one (Case 9) it was present only on expiration. This was maximum in the second left intercostal space close to the sternum in all except one (Case 2) where it was maximum in the third intercostal space. The thrill was apparently systolic in time in one (Case 7) and in the others it was limited to, or extended into and was maximum in, diastole. The timing of the thrill required considerable care and was checked with electrical records of the murmur. The first sound at the apex was uniformly normal. The pulmonic second sound was increased in eight cases and in three it could not be distinguished from the loud murmur. At times the increased sound was clearly distinguished in the third intercostal space although it was obscured by the murmur in the second space.

There was a continuous murmur in the pulmonic area in all cases (Fig. 1). This varied from a soft blowing hum, through a slightly rough, to a loud rough roaring murmur. This was accentuated in

systole in Case 7, during late systole and early diastole in six (Fig. 2) and at the beginning of diastole in the other four. Some errors were made in favor of systolic accentuation, but these were corrected after

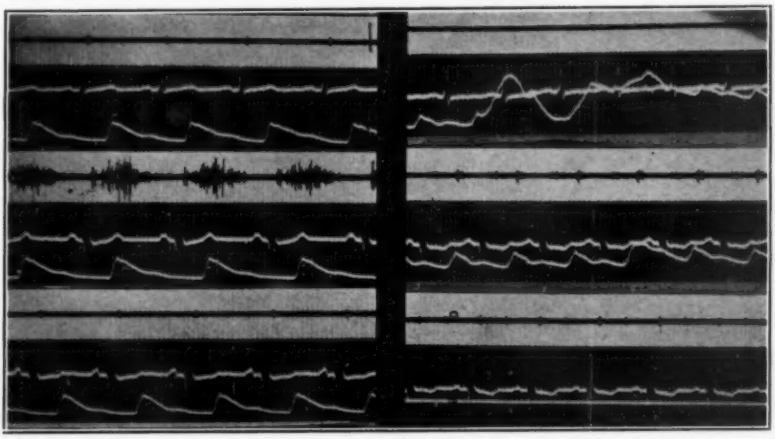


A. *B.*

Fig. 1.—Electrocardiogram and electrical recording of murmur in Case 8. From top to bottom, Leads I, II, and III of electrocardiogram, and murmur at apex, pulmonic and aortic areas, respectively. Pulse tracing from left wrist.

A, Before operation, July 12, 1939. Continuous murmur, maximum at pulmonic area and accentuated in early diastole.

B, After operation, Oct. 4, 1939. Shows complete disappearance of murmur.



A. *B.*

Fig. 2.—Electrocardiogram and electrical recording of murmur in Case 2. From top to bottom, Leads I, II, and III of electrocardiogram, and murmur at apex, pulmonic and aortic areas, respectively. Pulse tracing from left wrist.

A, Before operation, April 26, 1939. Continuous murmur at pulmonic area accentuated in late systole and early diastole.

B, After operation, May 24, 1939. Complete disappearance of murmur.

electrical recording of the murmur. These records were made in all except Cases 7 and 11. The murmur was maximum in the first left intercostal space near the sternal border in one case, in the third interspace in one, and in the second interspace in the others. A venous hum from the cervical veins was excluded by showing that jugular compression did not affect the murmur. The systolic element of the murmur was transmitted to the apex in all except the seventh case. The diastolic murmur was definitely audible at the apex in eight instances and in two had previously led to a diagnosis of mitral stenosis. The systolic element of the murmur was audible in the neck in all and was audible in the back between the scapulae in all but the seventh patient. The systolic element or the continuous murmur was faintly audible in the aortic area in all instances.

LABORATORY FINDINGS

The urine examination and the Wassermann test were negative and, with the exception of a moderate anemia in one case, complete blood counts were normal. With one exception (Case 4), enlargement of the heart was uniformly demonstrated by two-meter posteroanterior and oblique roentgenograms. The area of the pulmonary conus was slightly to moderately prominent in all instances (Fig. 3). In two instances, however, this was evidenced by a straight line between the aortic knob and the prominence of the left ventricle in the posteroanterior view while oblique films showed a definite prominence of the conus. Prominence of the conus was most marked in the oldest patient. These hearts did not compare, however, with the very large dilated hearts demonstrated by roentgenograms in the four patients from the County Hospital autopsy series who had died of their congenital anomaly (Fig. 4).

The electrocardiograms showed no axis deviation except in the fourth case, which exhibited a slight right axis deviation. A rather prominent Q wave in Lead III was present in eight records, but in none was it one-fourth the height of the largest R wave. The R wave in Lead I was notched in two instances. The S-T interval was depressed in Leads II and III in three records, in Leads I and II in one case; and the T wave was inverted in Lead I in the first case. Frequent ventricular premature contractions were present in the eighth case (Fig. 1). All other electrocardiographic findings were normal.

SUMMARY OF PHYSICAL FINDINGS

In summary, these cases all had typical physical signs and laboratory evidence of patent ductus arteriosus. The continuous murmur in the pulmonic area, varying in intensity during each cardiac cycle and usually maximum in late systole or early diastole, emphasized by Gibson[96] as being pathognomonic of this lesion, is the most important sign. We believe that this murmur is probably present in every patient past infancy and would not explore a patient in which it was not

present. According to Abbott,[94] it occurs in only one-third of the cases. This statement is based upon the 92 cases collected from the literature which we, as far as they could be identified, have also reviewed. The records of the physical examinations in these cases in the literature were often incomplete, and many were not carefully studied before death. After reviewing the various and sundry descriptions of the murmurs in the previous hospital records of our patients,

A. *B.*

Fig. 3.—Two-meter posteroanterior roentgenograms in Case 6.

A, Before operation, June 15, 1939. Enlargement of heart and definite prominence of pulmonary conus. Transverse diameter of heart 9.1 cm., of chest 17.6 cm.

B, Two weeks after operation, July 1, 1939. Decrease in size of heart and less prominence of pulmonary conus. Transverse diameter of heart 8.6 cm., of chest 17.5 cm.

Fig. 4.—Two-meter posteroanterior roentgenogram of patient with patent ductus arteriosus, from Los Angeles County Hospital autopsy series, who died at the age of 33 years with bacterial endarteritis of ductus.

we are particularly convinced that the lack of description of this most characteristic murmur does not mean that it was not present at the time of the examination. The pulmonic area is often overlooked, and the examiner may not be alert to the characteristics of this murmur which is so distinctive when sought. In the 27 instances in the literature of cases in which clinical diagnoses were made, a description

compatible with this murmur was recorded in 25. Although a description of the murmur was often omitted, we have been unable to find a single case of patent ductus in which the existence of the typical murmur was specifically denied. The murmur is possibly not always present in early infancy, but in at least three of our patients a diagnosis of congenital heart disease had been made at birth. The same murmur is heard over an aortic aneurysm which has ruptured into a vein, or a peripheral arteriovenous fistula, but these can be easily excluded. The continuous hum, frequently heard over the veins of the neck in children, is somewhat similar and may be heard below the clavicle, but it can be easily excluded by jugular compression. The murmur of pulmonary insufficiency can be excluded on the basis of other findings.

In addition to the characteristic murmur, a palpable thrill, increase or reduplication of the pulmonary second sound, prominence of the pulmonary conus on roentgen examination, absence of cyanosis, increase of pulse pressure with low diastolic pressure particularly after exercise, a systolic sound over the femoral artery particularly after exercise, and absence of axis deviation of the electrocardiogram are usually present as confirmatory findings. We have found Gerhardt's dullness along left upper sternal border unreliable and difficult to interpret. We rely entirely upon the roentgenogram to determine the size of the pulmonary conus.

OPERATION

The technical problems of the surgical procedure, and particularly the importance of the application of the principles involved in the ligation of large arteries which were emphasized by Reid,[97] will be discussed in a separate article in *The Journal of Thoracic Surgery*.[99]

A patent ductus was found and ligated in all eleven cases, and none showed evidence of any complicating lesion. Immediately upon application of the ligature the thrill disappeared, and there was a rise in the blood pressure, particularly the diastolic pressure, with a decrease in the pulse pressure (Fig. 5). As Holman[98] has pointed out, the obliteration of such an arteriovenous fistula causes an automatic rise in blood volume in the arterial tree. This suggests the advisability for caution in the use of postoperative transfusions or intravenous fluids, and we have not used them. In all cases the operative and postoperative course was remarkably smooth and uneventful. Seven cases showed some evidence of fluid in the chest, and 200 c.c. or less of serosanguineous fluid were aspirated from three cases. Postoperative discomfort was relatively slight.

COMPLICATIONS

In two cases huskiness of the voice was noticed one and three weeks, respectively, after operation. Examination showed paralysis of the

left vocal cord. In both the voice has returned to normal, although in one there is only slight motion of the left cord.

Patient 3 had an entirely uneventful convalescence and was discharged on the fourteenth day in good condition. She returned to normal activity and was apparently entirely well until thirty days after the operation when she developed a fever and pain between the scapulae. After readmission three blood cultures were positive for

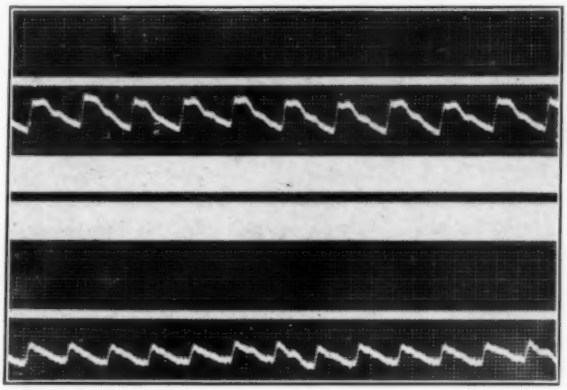


Fig. 5.—Pulse tracing taken during operation in Case 2. Above before, and below immediately after ligation of ductus arteriosus.

Staphylococcus aureus. She developed anemia, pulmonary emboli, and died forty-eight days after operation. Autopsy showed bacterial endarteritis of the ductus and adjacent pulmonary artery, a mycotic aneurysm of the ductus bounded by pleura and pericardium with re-establishment through the aneurysm of the connection between the aorta and pulmonary artery. There was no evidence of infection outside of the vessel in the field of operation. Although these patients are particularly subject to this complication without intervention, the normal temperature after operation makes it seem unlikely that it was present at the time of the ligation. The exact factors precipitating this complication could not be clearly determined. This case will be reported in more detail elsewhere.[99]

FINDINGS AFTER LIGATION

The other ten cases are apparently entirely relieved of their cardiac lesion. The elevation of the blood pressure, noted postoperatively, lasted from three to eleven days and always returned to normal. The thrill and accentuated pulmonary second sound disappeared. In six cases a soft, purely systolic murmur remained at the pulmonic area while in five the murmur completely disappeared. The remaining systolic murmurs have decreased in intensity on subsequent examinations. The weakness, palpitation, fatigue, and dyspnea have disappeared. The oldest patient, who had been bedridden, is now leading

a normal life without symptoms. The children, who had been forced to avoid exercise and lead a sedentary life, are now skating and playing ball with other children without distress.

SUMMARY

This procedure must still be considered to be in the experimental stage. It is clear that technically a patent ductus can be ligated with comparative ease, although the results will depend upon the skill and experience of the surgeon. The indications for the operation are not as yet clearly defined, and the ultimate results are unknown.

If the operation will prevent congestive failure, it would seem wise to do it before the heart is greatly hypertrophied or decompensation has developed. If the operation will prevent the development of bacterial endarteritis, it would seem to offer the greatest advantage if done early in life, before the intima is damaged in such a way as to favor the establishment of this fatal infection. If ligated later in life, after the intima had been damaged, we do not know whether the intima would change and regain its immunity. Technically, in our series, the dissection and ligation of the ductus was easiest in the youngest cases. The possibility of avoiding this complication which causes death in 50 per cent of these patients certainly deserves careful investigation. Further experience is required to determine the exact risk involved in such an effort to avoid future complications.

For some time the indications will probably be relative. In general, we feel that the larger the heart, the greater the symptoms, and the higher the pulse pressure, the more seriously ligation should be considered. It is hoped that the interest aroused by the possibility of improving the future outlook for children with this anomaly will lead to the accumulation of information required to answer these questions. It is hoped that the future course of these and similar patients will not only lead to a long and normal life for them but will also finally answer the question of how much ligation can improve the eventual prognosis for patients with patent ductus arteriosus.

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THE ROLE OF VITAMIN K IN THE ETIOLOGY, PREVENTION, AND TREATMENT OF HEMORRHAGE IN THE NEWBORN INFANT

PART II

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IN A recent article the authors[1] called attention to the unusual prothrombin content of the blood in a group of ten newborn infants. They further showed the apparent effect of vitamin K concentrate* administered by mouth on successive days to a group of ten newborn infants. In the treated cases no unusual prothrombin deficiency was noted. In the control series unusual prothrombin deficiencies were observed in the first four days of life, the prothrombin approaching the normal adult level by the fifth day. These facts suggested a direct relationship between the prothrombin content of the blood and the bleeding that occurs in hemorrhagic disease of the newborn. The authors[2] further reported in an earlier article the prompt effect of vitamin K concentrate in one case of unnatural bleeding during the neonatal period and predicted that vitamin K concentrate would prove effective in the prevention and cure of hemorrhagic disease. Bleeding was checked in two to three hours' time, and the prothrombin and the clotting time were promptly reduced to a normal level. In another case unusually high prothrombin time not associated with bleeding was promptly reduced to normal limits after administration of vitamin K by mouth.

Since this report was published we have been able consistently to verify these results. In every instance vitamin K concentrate administered by mouth has been followed by prompt reduction of prothrombin time and clotting time, with cessation of any apparent bleeding.

The purpose of this second report is to discuss further the etiology, prevention, and treatment of unnatural bleeding in the neonatal period and at the time of birth. Additional cases of subclinical hemorrhagic disease and one case of spontaneous bleeding, all successfully treated with vitamin K concentrate, are reported. Studies by the authors concerning the effect on prothrombin time and clotting time of the blood in the infant following administration of vitamin K concentrate before and after the onset of labor are described.

The prothrombin rate determinations recorded in this report were done after the method of Bray and Kelly.[10] This method makes possible

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*The Vitamin K concentrate used in this study was made available through the courtesy of Abbott Laboratories.

prothrombin rate determinations on a large scale in newborn infants, in that capillary blood obtained by heel puncture can be satisfactorily used. These writers in a comparative study have demonstrated that prothrombin time by this method compares accurately with those in which blood from the anterior longitudinal sinus is used. A second article by these investigators,[11] describing the technique of their method, has been accepted for publication.

Believing as they do that varying degrees of prothrombin deficiency do exist at the time of birth, the authors have observed the effect of vitamin K concentrate, administered to the mother, before and after the onset of labor, on the prothrombin time and the clotting time in the infant.

Table I shows the prothrombin times and clotting times on successive days in a group of control infants. These cases were observed during the months of February and March. Attention is again called to the prothrombin deficiency previously described by the authors and others. The daily variations in prothrombin time are again strikingly apparent.

TABLE I

CONTROLS DURING FEBRUARY AND MARCH

CASE NO.	MOTHER'S PROTH. (SEC.)	CORD PROTH. (SEC.)	1ST DAY		2ND DAY		4TH DAY		6TH DAY	
			PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)
1	37	60	110	4	55	2½	20	2	21	2
2	18	19	18	2	34	2½	38	2½	30	3
3	22	100	145	7	540	11	(Died of hemorrhagic disease)			
4	–	–	25	3	23	2	20	2	20	2
5	–	–	30	2	35	2½	30	2½	20	2½
6	20	20	28	2	30	4	–	–	21	2
7	19	18	18	2½	23	2½	20	2	–	–
8	18	22	45	3½	70	5	120	3	32	4

Table II shows the prothrombin times and clotting times on successive days of a group of infants also studied during the months of February and March. To the mothers of these infants 8 c.c. of vitamin K concentrate along with bile salts were administered after the onset of labor.

Although the prothrombin times observed in this group of infants were in general lower than those of the control infants, high prothrombin times were encountered with too great a frequency to believe that any real vitamin K effect was apparent.

In Table III are shown the prothrombin times and clotting times on successive days in a group of control infants studied during the months of April, May, and June. Attention is called to the fact that prothrombin deficiency was not observed with the same regularity encountered in Series 1 and 2. Three infants did show the prothrombin deficiency

which the writers have learned to expect. The generally lower level of prothrombin time in this series as compared to other series studied by us during the winter months suggested that vitamin K deficiency may, in fact, be seasonal.

TABLE II

MOTHERS WHO RECEIVED VITAMIN K TREATMENT AFTER ONSET OF LABOR
(DURING FEBRUARY AND MARCH)
(8 C.C. OF VITAMIN K PLUS 3 CAP. OF BILE SALTS)

CASE NO.	TIME ELAPSED AFTER VIT. K ADMINISTRATION	MOTHER'S PROTH. (SEC.)	CORD PROTH. (SEC.)	1ST DAY		2ND DAY		4TH DAY		6TH DAY	
				PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)
1	2 hr. 30 min.	25	23	30	2	24	3	35	3	24	3
2	7 hr.	35	28	25	2	77	2½	38	2½	23	2
3	3 hr.	24	35	38	2	62	3	24	2	24	3
4	5 hr.	26	–	27	3	23	3	33	3½	20	2½
5	5 hr.	24	27	20	2	22	2	24	3	21	3½
6	14 hr.	15	–	20	2	22	2	32	2½	22	3

Table IV shows the prothrombin times and clotting times on successive days of a group of infants also studied during the months of April, May and June. To the mothers of these infants 3 c.c. of vitamin K concentrate with bile salts were administered daily during the last two weeks of pregnancy. When onset of labor was deferred longer than two weeks, the mother was kept on a maintenance dose of 1 c.c. daily. These mothers were visited daily by a clinic nurse who personally administered the prescribed amount of vitamin K concentrate.

The writers realize that Series 4 is too short to arrive at definite conclusions concerning a vitamin K effect following administration of vitamin K to mothers in this fashion. They are encouraged to believe, however, that the results here shown may be of real clinical importance. If the apparent effect here shown can be proved to be a usual and constant effect, there is very real reason to hope that if vitamin K is used in this preventive fashion intracranial hemorrhage associated with normal labor and delivery and unnatural bleeding in the neonatal period may be materially lessened.

CASE 1.—Hospital No. 148318. This white female infant was delivered spontaneously after a normal labor. The birth weight was 3940 gm. On the second day of life the child began to bleed from excoriated places on her face and from a puncture wound in her heel. The prothrombin time was 8 min., and the clotting time was 8 min. One cubic centimeter of vitamin K concentrate was administered by mouth on two occasions two and one-half hours apart. Bleeding ceased within two and one-half hours after the initial dose of vitamin K. The following morning the prothrombin time was found to be 20 sec. and the clotting time 2½ min. The subsequent nursery course was uneventful.

TABLE III

CONTROLS DURING APRIL, MAY, AND JUNE

CASE NO.	MOTHER'S PROTH. (SEC.)	CORD PROTH. (SEC.)	1ST DAY		2ND DAY		3RD DAY		4TH DAY		5TH DAY		6TH DAY	
			PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)
1	19	27	38	3	18	3	20	3	–	–	30	3½	18	1½
2	20	20	20	2½	30	3	27	3	20	3	–	–	–	–
3	18	19	18	3	18	3½	18	3	–	3½	–	3	–	–
4	18	19	18	3	18	4	25	2	25	2	–	2	–	–
5	20	–	15	2	20	1½	–	2	–	2	25	3½	18	2
6	23	–	20	3	30	3½	24	3	20	2½	–	–	–	–
7	25	–	17	4	19	3½	16	3½	20	4	–	–	19	3
8	22	–	22	3	19	4	17	4	–	–	–	–	–	–
9	19	–	17	3	23	4	19	4½	–	–	–	–	–	–
10	15	–	16	–	55	6	(See Case Report 2)							
11	21	–	22	3½	19	3½	20	3½	20	3½	17	4	–	–
12	24	–	23	3½	26	4	18	3	20	4	–	–	–	–
13	–	–	218	–	(See Case Report 3)									
14	20	–	21	5	20	4	55	8½	(See Case Report 5)					

TABLE IV

MOTHERS TREATED WITH VITAMIN K BEFORE ONSET OF LABOR
(DURING APRIL, MAY AND JUNE)

CASE	AMT. OF "K"	MOTHER'S PROTH. (SEC.)	CORD PROTH. (SEC.)	1ST DAY		2ND DAY		3RD DAY		4TH DAY		6TH DAY	
				PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)	PROTH. (SEC.)	CLOT. (MIN.)
1	1 c.c. T.i.d. 5 days	16	22	17	2½	18	2	20	2	20	2	20	2
2	1 c.c. T.i.d. 14 days 1 c.c. O.d. 3 days	20	20	18	2½	18	2	18	–	18	2½	19	2
3	1 c.c. T.i.d. 14 days 1 c.c. O.d. 3 days	20	20	18	2½	18	2	18	–	18	2	18	2
4	1 c.c. T.i.d. 14 days 1 c.c. O.d. 10 days	20	20	20	3	20	2½	16	2½	18	2½	18	–
5	1 c.c. T.i.d. 14 days 1 c.c. O.d. 8 days	18	18	17	1½	18	3	18	1½	18	2	–	–
6	1 c.c. T.i.d. 7 days	17	20	20	1½	20	1½	–	–	20	1½	–	–
7	1 c.c. T.i.d. 14 days 1 c.c. O.d 13 days	22	–	18	1½	18	1½	22	1½	–	–	–	–
8	1 c.c. T.i.d. 14 days 1 c.c. O.d. 6 days	16	–	25	2½	16	2	18	2½	17	3	–	–
9	1 c.c. T.i.d. 14 days 1 c.c. O.d. 9 days	20	–	16	2½	18	–	18	3½	25	4	–	–
10	1 c.c. T.i.d. 14 days 1 c.c. O.d. 20 days	18	20	22	4	19	4	21	2½	–	–	–	–

CASE 2.—Hospital No. 149702. A white female child was born in the University Hospital June 16, 1939, at 8:34 A.M. Prothrombin time at the end of twenty-four hours was 16 sec., at the end of forty-eight hours at 12 P.M. the prothrombin time was found to be 55 sec. and the clotting time 6 min. At 4:45 P.M. the prothrombin time was 2 min., 30 sec. and the clotting time 7 min. The child was bleeding profusely from the heel puncture done two hours previously. The crib covers were markedly soaked with blood. At 5:00 P.M. 2 c.c. of vitamin K was administered by mouth. At 7:30 P.M. all bleeding had stopped, the prothrombin time had dropped to 35 sec., and the clotting time was 3 min. The following morning the prothrombin time was 17 sec. and the clotting time 4 min. The child's subsequent stay in the nursery proved uneventful.

CASE 3.—Hospital No. 149092. A colored male infant was born in University of Virginia Hospital at 11 P.M., May 23, 1939. At 10 A.M., May 24, it was noticed that the child was oozing blood from the cord stump. At 11:30 A.M. the infant vomited blood, and the prothrombin time was found to be 3 min., 35 sec. At 2:30 P.M. 2 c.c. of vitamin K were administered by mouth. This was shortly vomited. At 3:30 P.M. 2 c.c. of vitamin K were again administered, and the infant was found to be bleeding from the puncture in the heel. At 4:30 P.M. the prothrombin time was 6 min., and the clotting time was 6 min. At 6:00 P.M. bleeding from the wound in the heel had ceased. At 7:30 P.M. the prothrombin time was 38 sec. and the clotting time 2½ min. At 12 noon the following day the prothrombin time was 34 sec. and the clotting time 2 min. Subsequent course in the nursery proved uneventful.

Case 4 is presented as an example of a fatal case of hemorrhagic disease in which the writers believe that the fatal hemorrhage would have been prevented if vitamin K in adequate dosage had been administered to the infant shortly after birth.

CASE 4.—Hospital No. 149092. This four-day-old white child was admitted to the University of Virginia Hospital with the complaint of difficult respiration of four hours' duration. Labor was normal and delivery easy. At the time of admission the child was obviously in a moribund condition, cyanotic and laboring under severe respiratory difficulty. There was total absence of breath sounds over the right lung. Death occurred a few minutes after admission to the hospital. Autopsy revealed massive hemorrhage in the right pleural cavity with complete collapse of the right lung. Prothrombin clotting time of blood removed from the anterior longitudinal sinus shortly after death was 3 min. and 40 sec.

CASE 5.—Hospital No. 149906.—A colored female weighing 3945 gm., was delivered at University of Virginia Hospital June 25, 1939, in good condition. On the first day the prothrombin time was 21 sec. and clotting time 5 min. On the second day the prothrombin time was 20 sec. and clotting time 4 min. At 11 A.M. on the third day the prothrombin time was 55 sec. and clotting 8½ min. Brisk bleeding followed heel puncture and still continued at 3 P.M., when the prothrombin time was found to be 65 sec. At that time 2 c.c. of vitamin K concentrate were given by mouth; thirty minutes later the prothrombin time was 70 sec.; one hour later it was 75 sec. and the clotting time 10 min. At 4:30 P.M. the prothrombin time was still 75 sec., but by 5 P.M. bleeding had ceased and the prothrombin time had fallen to 40 sec. By 5:30 P.M., two and one-half hours after vitamin K therapy, the prothrombin time was 23 sec. and the clotting time 3 min. The child's course has since proved uneventful.

Cases 6, 7, and 8 illustrate the prompt effect in suitable cases of the recently announced synthetic vitamin K in restoring to normal level the prothrombin deficiency so commonly encountered in the newborn infant. Synthetic vitamin K* should greatly facilitate further studies of this nature.

CASE 6.—Hospital No. 150548. Baby M., a white male infant, was born in the University Hospital on July 20, 1939. Prothrombin time at birth was 17 sec. At the end of twenty-four hours the prothrombin had risen to 26 sec., and the clotting time was 3 min. At the end of forty-eight hours the prothrombin time was further increased to 35 sec. and the clotting time to 4 min. After seventy-two hours the prothrombin time had risen to 48 sec. and the clotting time was found to be 5½ min. At this point 1 mg. of synthetic vitamin K was administered by mouth. One hour afterwards the prothrombin time had fallen to 35 sec. and the clotting time to 3 min. Two and one-half hours after administration of vitamin K the prothrombin time had fallen to 19 sec. and the clotting time to 2 min. The following morning prothrombin time was 14 sec. and clotting time 2½ min. The subsequent nursery stay was uneventful.

CASE 7.—Hospital No. 150582. Baby M., a female infant, was born in University of Virginia Hospital on July 21, 1939. The prothrombin time at birth was 17 sec. At the end of twenty-four hours prothrombin time was 24 sec. and the clotting time 3½ min. The following morning prothrombin time had risen to 50 sec. and the clotting time was 6 min. At this point 1 mg. of synthetic vitamin K was administered by mouth. Two hours later the prothrombin time had fallen to 20 sec., and the clotting time was 2½ min. Subsequent nursery stay was uneventful.

CASE 8.—Hospital No. 150910. Baby L., a white female infant, was born in the University of Virginia Hospital, Aug. 2, 1939. The prothrombin time at birth was 24 sec. and the clotting time was 3 min. At the end of twenty-four hours the prothrombin time was found to be 60 sec. and the clotting time 5 min. Forty-eight hours after delivery the prothrombin time was 61 sec. and the clotting time 5½ min. At this point 1 mg. of synthetic vitamin K was given by mouth. At the end of two hours the prothrombin time was 40 sec. The following morning the prothrombin time was 19 sec. and the clotting time 2½ min. The subsequent nursery stay was uneventful.

DISCUSSION

In 1852 Minot[3] under the title, "On Hemorrhage from the Umbilicus in Newborn Infants, with an Analysis of Forty-Six Cases," first described the condition now known as hemorrhagic disease of the newborn. Since 1894 when Townsend[4] gave to this syndrome its present name, no adequate explanation for the spontaneous bleeding described by him has been advanced. Little progress has been made toward the reduction of mortality in this often fatal condition. Most writers in this subject have insisted on spontaneous hemorrhage as a prerequisite in the diagnosis of this syndrome. Some have demanded in addition that the clotting time of the blood be prolonged to an unusual degree. Clifford[5] in a recent critical article on this subject suggests that a classification similar to the one now in use at the Boston Lying-In Hospital be ad-

*Furnished through the courtesy of E. R. Squibb and Sons.

hered to, and he feels that any further attempts to classify hemorrhagic disease will only add to the confusion now existing concerning unnatural bleeding at the time of birth and in the neonatal period. He would not classify as examples of hemorrhagic disease "localized bleeding of traumatic origin in the central nervous system, liver, adrenals, etc.," unless, in addition, "the infant develops spontaneous external or internal hemorrhages in areas not directly related to the injury." He would include "macroscopic intracranial hemorrhage occurring in the absence of a history of trauma and associated with multiple hemorrhage in other areas." In the light of their own findings the writers cannot subscribe to this conception of hemorrhagic disease.

Since our first report concerning prothrombin deficiency encountered in a group of newborn infants and the effect of vitamin K on such cases, we have enlarged our control series to some sixty-odd cases, and have observed prothrombin deficiency with surprising frequency. We are convinced that prothrombin deficiency is the immediate cause of hemorrhage in the loose clinical syndrome commonly considered as hemorrhagic disease of the newborn. Whipple[6] in 1912 suggested this etiology and reported one case. Brinkhous, Smith, and Warner[7] described the prothrombin deficiency found in the cord blood of eight infants. Owen and co-workers[8] and Quick and Grossman[9] have reported prothrombin changes in the first week of life similar to those described by the writers. We are further convinced that instances of spontaneous hemorrhage represent but extreme degrees of prothrombin deficiency and that border line or subclinical cases occur with surprising frequency. Only in the degree of prothrombin deficiency do such cases differ one from the other. In support of this conception and as examples thereof, the writers submit the cases here reported and their previously recorded findings. In no instance has vitamin K concentrate failed to accomplish the results described and the therapeutic response has been prompt to an astonishing degree.

Unusually prolonged clotting time should not be considered a necessary prerequisite in the proper diagnosis of hemorrhagic disease. We have observed cases with rather marked prothrombin deficiency with clotting times of 5 to 6 minutes.

A comparison of control cases observed in February and March with control cases observed in June suggests that prothrombin deficiency occurs with far greater regularity during the winter months. When sufficient cases have been studied, we suspect that a seasonal variation will be apparent.

If subclinical instances of hemorrhagic disease do occur in the neonatal period, we suggest that this same condition of bleeding may be present at the time of delivery in some instances and does, in fact, account for some of the cases of intracranial accidents now charged to the ob-

stetrician, even though unusual trauma cannot be proved. In Case 3, which fulfils all the usual diagnostic requirements of hemorrhagic disease, the condition was apparent twelve hours after birth. It seems reasonable to suppose that similar conditions may have been present at the time of birth. When sufficient specimens of cord blood have been studied, it seems not unlikely that instances of prothrombin deficiency existing at the time of birth will be brought to light. In our limited study we have observed in the cord blood prothrombin deficiency as determined by the Quick method in two instances. The respective prothrombin times were 1 min. 50 sec. and 1 min. At the end of twenty-four hours the prothrombin times increased to 2 min. 25 sec. and 1 min. 50 sec., respectively. At the end of forty-eight hours the respective prothrombin times were 9 min. and 1 min. The infant with exceedingly high prothrombin time died from intracranial hemorrhage.

SUMMARY

Four cases of subclinical hemorrhagic disease are reported all associated with high prothrombin times. In each instance vitamin K concentrate administered by mouth in a few hours' time promptly reduced the prothrombin times to a safe and normal level.

One case of hemorrhagic disease of the usual variety is reported, in which vitamin K administered by mouth promptly stopped all bleeding and reduced the prothrombin time to a safe and normal level.

The hypothesis is advanced that marked prothrombin deficiency is the immediate cause of the syndrome now known as hemorrhagic disease of the newborn and that subclinical cases without spontaneous bleeding are of frequent occurrence. Evidence is presented in support of our suggestion that the prothrombin deficiency encountered at this age period is directly concerned with an insufficient amount of vitamin K.

This same condition of bleeding is probably present at birth and may in fact account for many instances of intracranial hemorrhage associated with normal labor and delivery.

The effect of vitamin K on prothrombin time and clotting time in a series of infants to whose mothers vitamin K has been administered previous to, and after the onset of, labor is described. The authors are encouraged to believe that when more cases have been studied, similar results will be shown in those infants vitamin K-treated through the mother and that intracranial bleeding associated with normal delivery can be materially lessened by such methods of preventive therapy.

In vitamin K concentrate an agent is now available which will prevent and control unnatural bleeding associated with prothrombin deficiency and occurring in the neonatal period. Synthetic vitamin K (2-methyl-1, 4-napthoquinone) has been found to be equally efficacious.

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VITAMIN A REQUIREMENTS IN INFANCY AS DETERMINED BY DARK ADAPTATION

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IN PREVIOUS communications[1] we stated that the average diet of artificially fed infants contains an adequate amount of vitamin A. This contention was based on the fact that no improvement in the nutritional status or increase in the immunity to infections was brought about when large quantities of vitamin A in the form of cod-liver oil or halibut-liver oil were added to the average diet of infants. Furthermore, there was no difference as to nutritional state or susceptibility to infections between infants receiving a diet containing one-fourth the vitamin A content of the average diet and those receiving a diet containing from four to eight times the number of vitamin A units in the average diet. It would seem, therefore, that the average diet of artificially fed infants contains at least four times as many units of vitamin A as the minimum requirement, judged by the nutritional state of infants and their resistance to infection.

The question arose as to whether a more sensitive criterion than nutritional status or susceptibility to infections could be utilized in determining the vitamin A requirements in infancy. Recent reports[2] have indicated that night blindness, or poor dark adaptation, is a very early manifestation of vitamin A deficiency, and it may occur in persons who otherwise appear normal. In experiments conducted on cattle and on other animals, Guilbert and Hart[3] found that night blindness makes its appearance prior to other signs of vitamin A deficiency. Thus, this symptom preceded retardation of growth, susceptibility to infections, and xerophthalmia, which occurs late in the course of vitamin A deficiency.

Vision in the dark or in dim illumination is dependent on the presence of visual purple in the rods of the retina. It has been shown that there is a direct quantitative relationship between the regeneration of this substance and the amount of vitamin A present in the retina. In fact, according to Wald,[4] vitamin A is part of the visual purple molecule.

Within the past few years methods have been devised for testing visual adaptation to darkness.[5] These procedures have been applied to adults and older children. As a result of their use, a number of persons, although appearing normal in every way, were found to

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have poor dark adaptation which returned to normal following the administration of adequate amounts of vitamin A. In view of the fact that poor dark adaptation is probably a manifestation of very mild vitamin A deficiency in infants also, we decided to carry out similar tests with the hope of obtaining data which might be of value in determining the vitamin A requirements during the first year of life.

Friderichsen and Edmund[6] are the only investigators who, to our knowledge, have made tests on dark adaptation in infants. Briefly, their method consisted of placing infants in the dark room and flashing before their eyes a light, the brightness of which could be controlled by a series of filters. The lowest intensity of light causing certain movements of the eyes or eyebrows was regarded as the infant's "minimum reflexible," which, according to their reports, was related to the vitamin A status of the infant. We attempted to make use of this method in our clinic, but it soon became apparent that it was of no value in obtaining threshold levels. When the intensity of light was diminished so that we could no longer see the baby's face, we were not able to observe whether the baby was responding to the light.

It occurred to us that by fastening a vial containing a fluorescent radium paint on the forehead of the baby we might be able to observe movements of the head at intensities of light which were so low as to preclude visualization of the baby's face. With the use of the radium vial we found that light one one-hundredths as bright as the dimmest light employed by Friderichsen and Edmund elicited a characteristic response, namely, a rolling of the head in the direction of the light. Preliminary tests indicated that the minimum light threshold, after complete dark adaptation, could be obtained with this method. We did not attempt to determine the rate of dark adaptation following exposure to a bright light, because it has been shown by Hecht and Mandelbaum,[7] as well as by Wald and his co-workers,[8] that the rate of adaptation to darkness is not affected in vitamin A deficiency resulting from inadequate intake of vitamin A. On the other hand, these investigators have demonstrated that the minimum light threshold after complete dark adaptation, i.e., final rod threshold, is dependent on the vitamin A intake and is elevated early in the course of vitamin A deficiency.

The apparatus and technique which we used in our study are fully described in another communication.[9] However, a brief description of the procedure is as follows:

The infant was placed on his back and the vial containing radium paint was fastened over the forehead by a strip of adhesive plaster. In order to allow the eyes of the infant to become fully adapted to the dark, the test was not performed until the infant was in the dark

room for 30 minutes. Then, a light of known intensity was moved from side to side through an arc of 180 degrees at approximately 10 centimeters in front of the baby's eyes. A series of filters and wedges placed within the instrument made it possible to vary the intensity of the light. The lowest intensity of light causing a characteristic response was considered as the infant's threshold for vision in the dark. The photometric unit employed was the micromicro-lambert (1 micromicro-lambert = 1 foot candle $\times$ 1.076 $\times$ 10^{-9}), and, for simplicity, the threshold values obtained were expressed in terms of logarithmic units. Thus, a threshold value of 2.0 (100 micromicro-lamberts) represented a response to an intensity of light 10 times weaker than a value of 3.0 (1,000 micromicro-lamberts) and 100 times weaker than a value of 4.0 (10,000 micromicro-lamberts), etc.

Of course, a great deal of patience is required in carrying out these tests, and one must be certain that the movements of the head are not random movements. After some experience a true response can be readily distinguished from a random movement. If babies cry or are restless, it is difficult to carry out the test. We found that by placing such babies in the arms of an assistant, they frequently became quiet, and the test could then be carried out in this position. Because of the importance of the fatigue factor we began with the lowest intensity of light that our apparatus emitted and gradually increased the brightness until a characteristic response occurred. When no response occurs, one must be sure that the baby is not sleeping. This may be determined by using a light bright enough to enable one to examine the baby's face. Occasionally, however, we have found an infant to be asleep even though his eyes were open. In such a situation, squeezing the hand aroused the infant after which a prompt response to the light occurred.

Dark adaptation tests were carried out on a group of 26 normal infants who were inmates of a model child-caring institution. The ages of these infants varied from 1½ to 10½ months. The diet used at this institution is similar to that which is prescribed in private practice, but it was not supplemented with vitamin A-containing preparations. For example, 1 to 2 oz. (30 to 60 c.c.) of milk were given per pound (453 gm.) of body weight, the amount depending on the age of the infant; orange juice was prescribed at the age of 6 weeks, cereal at 4 months, vegetables at 6 months, desserts at 8 months, eggs at 10 months, and meat at 1 year.

The results of these tests are recorded in Table I; the threshold values, as previously stated, are expressed in logarithmic units. The mean value was 2.9, and the range, 2.4 to 3.3. In one infant (W. L.), repeated tests were conducted and, as may be noted, the maximum variation was only 0.4 log unit.

TABLE I

THE RESULTS OF DARK ADAPTATION TESTS IN INFANTS RECEIVING AN AVERAGE DIET

INFANT	AGE (MONTHS)	THRESHOLD (LOG $\mu\mu l$)
P. G.	1½	3.0
B. F.	2	3.0
S. N.	2	3.2
R. S.	3½	2.7
S. G.	3¾	3.2
H. P.	4	2.7
H. F.	4½	2.9
P. V.	4½	3.0
S. K.	5	3.2
M. S.	5¼	3.0
W. L.	5½	2.8
	6	2.4
	6½	2.6
A. G.	6	2.9
H. F.	6	2.6
J. K.	6	2.7
S. K.	6¼	2.9
S. K.	6½	2.9
B. O.	6¾	2.9
W. O.	6¾	2.9
I. Z.	7	2.6
B. L.	7½	2.7
H. D.	7½	2.9
S. E.	7¾	2.6
W. B.	7¾	3.3
B. B.	8	2.9
S. T.	8	2.8
W. K.	10½	2.7

The data obtained on these infants compared quite well with those noted in adults and in children with the same apparatus and under similar conditions. The mean threshold value obtained in 54 adults and in 144 children was 2.1, the range being 1.6 to 2.5. It was reasonable to expect lower threshold values in adults and in children than in infants because it must be remembered that the data obtained in infants are, strictly speaking, not the actual threshold levels of vision in the dark, since the light which is moved in front of their eyes must be of sufficient intensity to attract the babies' attention. If it were possible for babies to concentrate on the source of light as adults and children do when they are tested, lower values undoubtedly would have been obtained. However, the data obtained on infants were only slightly higher than those obtained on adults and children, and, for practical purposes, they may be regarded as threshold values.

A group of 9 infants who had been receiving 15 drops of halibut-liver oil,* i.e., approximately 17,000 vitamin A units daily for a period of 4 months, was tested in order to ascertain whether the addition of large quantities of vitamin A would bring about a lower threshold than that which was noted in infants receiving a diet unsupplemented with a vitamin A preparation. It will be noted in Table II that the

*Halibut-liver oil was supplied through the courtesy of Mead Johnson & Co.

range of threshold values in these infants was 2.5 to 3.2, the mean being 2.8. Thus, the threshold values obtained in the infants in the high vitamin A group were not significantly lower than those observed in infants receiving the unsupplemented diet.

TABLE II

RESULTS OF DARK ADAPTATION TESTS IN INFANTS RECEIVING A DIET SUPPLEMENTED BY LARGE QUANTITIES OF VITAMIN A (17,000 INTERNATIONAL UNITS DAILY) FOR A PERIOD OF FOUR MONTHS

INFANT	AGE (MONTHS)	THRESHOLD (LOG $\mu\mu l$)
F. K.	6	2.7
H. L.	6¾	2.7
E. K.	9	2.6
L. S.	9	3.2
L. M.	9½	2.7
A. M.	11½	2.5
C. R.	12	3.0
F. L.	12	2.7
B. K.	13	2.7

In order to secure information regarding the effect of a reduced vitamin A intake on dark adaptation, 4 infants were given a diet containing approximately one-fourth the vitamin A content of the average diet, and 14 other infants received a diet containing approximately one-twelfth the amount present in the average diet. The diet of the first group of infants consisted of a dry preparation of milk which was partly skimmed (dryco) and which, when reconstituted to its original volume, contained 1.5 per cent fat. The vitamin A content was 650 international units per quart of reconstituted milk. This unitage represents approximately one-third the vitamin A content of a quart of average whole milk. Orange juice was given at the age of 6 weeks, cereal at 4 months, and vegetables at 6 months. Spinach and carrots, as well as butter and egg yolk, were excluded from the diet because of their high vitamin A content. These infants were placed on this diet at 2 to 3 months of age and were observed for periods varying from 8 to 10 months. Repeated dark adaptation tests carried out during the period that they had been on this special diet revealed normal threshold values. During this time, it may be added, their gains in weight and in height were within normal limits, and they were no more susceptible to infection than infants receiving large amounts of vitamin A.

It is interesting to note that one of the infants in the group receiving a diet containing one-fourth the vitamin A content of the average diet was one of identical twins; the other twin received a diet supplemented by approximately 17,000 units of vitamin A. These two infants received these special diets for a period of 10 months, and during this time repeated dark adaptation tests revealed no significant difference in their threshold values. Throughout this whole period there was

no difference in the twins in their growth in height or weight nor in their susceptibility to infections.

The diet of the group of infants receiving approximately one-twelfth the amount of vitamin A present in the average diet consisted of a dry preparation of milk which, when reconstituted to its original volume, contained 0.5 per cent fat. Assay of this milk carried out in our laboratory revealed that it contained 175 international units of vitamin A per quart of reconstituted milk. As previously stated, there were 14 infants in this group, the youngest being 3 weeks of age and the oldest 3 months of age when they were placed on this diet. Vegetables, as well as butter and egg yolk, were excluded from the diet in order to restrict the vitamin A intake principally to that which was present in the special milk preparation. It should be added, however, that 1 oz. of orange juice, which was given at 6 weeks of age, contains approximately 25 international units of vitamin A. Since these babies received 20 to 32 oz. of reconstituted milk daily, the vitamin A intake was, therefore, between 135 and 200 units daily.

Dark adaptation tests were carried out on these infants after they had received the diet for a period of 3 months, and the results of these tests, as may be noted in Table III, were normal. The mean value was 2.8, and the range, 2.5 to 3.0. Three infants were continued on the low vitamin A diet for 6 months. The threshold values obtained at the end of this period were again within normal limits.

TABLE III

RESULTS OF DARK ADAPTATION TESTS IN INFANTS RECEIVING A LOW VITAMIN A DIET (135 TO 200 INTERNATIONAL UNITS DAILY) FOR PERIODS VARYING FROM THREE TO SIX MONTHS

INFANT	AGE (MONTHS)	THRESHOLD (LOG $\mu\mu l$)
R. K.	3¾	3.0
A. N.	4	2.7
G. G.	4	2.5
H. W.	4	2.7
	6¼	2.7
	7	2.7
M. G.	4½	2.7
L. C.	4¾	2.7
	6¾	2.7
	7½	2.7
M. G.	4¾	2.6
	5	2.7
S. M.	6½	3.0
	7½	2.5
	8	2.7
M. R.	5½	2.8
	6	3.0
	7	3.0
J. G.	6	3.0
S. F.	6	3.0
D. Y.	6½	3.0
K. M.	7	2.7
C. L.	7½	2.7

During the course of this investigation, we carried out dark adaptation tests on two infants who, because of eczema, were given a proprietary preparation of soy bean flour as a substitute for milk. This synthetic product is almost devoid of vitamin A.* One of these infants (F. K.), who was 4 months old when the preparation was prescribed, received this product for 6⅓ months. In addition, this infant was given cereal, 1 oz. of orange juice, and 10 drops of viosterol. This diet contained approximately 32 international units of vitamin A.

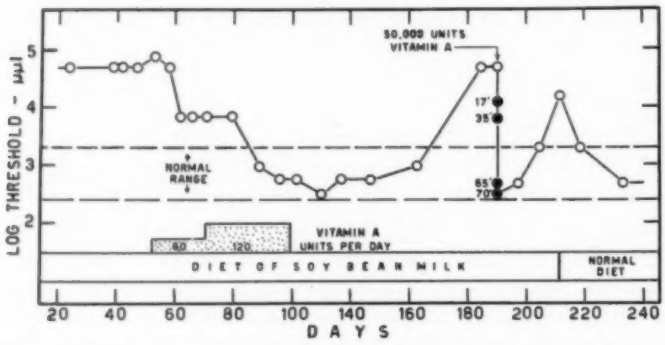

Chart 1.—Effect of daily minimal amounts of vitamin A (60 and 120 units) and of a massive dose of vitamin A (50,000 units) on the light threshold of an eczematous infant (F.K.), who developed poor dark adaptation as a result of a diet containing about 32 international units of vitamin A. The solid circles indicate the threshold levels following the administration of the massive amount of vitamin A, and the figures to the left of the solid circles represent the number of minutes that have elapsed.

In Chart 1 are plotted the results of the dark adaptation tests in this infant. It may be noted that 23 days after this special diet was begun, the high threshold value of 4.7 was obtained. Since this result is expressed in logarithmic units it represents an intensity of light about 100 times stronger than that which was necessary to elicit a response in the previous groups of infants. Repeated tests conducted over a period of 4 weeks revealed approximately the same value. We then decided to determine the minimum amount of vitamin A necessary to restore dark adaptation to normal. Sixty international units of vitamin A in the form of U.S.P. reference cod-liver oil were given daily. In 9 days the threshold fell to 3.6 and remained at this level for 8 days. The dose of cod-liver oil was then increased to 120 units of vitamin A, and in 16 days the dark adaptation was normal. Repeated tests carried out during the next 26 days revealed normal values. Cod-liver oil was then discontinued, and in 50 days the threshold rose to a value of 4.7.

*Assays carried out in our laboratory by Miss Mildred Weinstock revealed that 1 oz. of this preparation contained 2.5 international units of vitamin A. Since 3 to 6 oz. are the amounts generally prescribed, this preparation provides daily only 7½ to 15 units of vitamin A.

To determine the effect of a single large dose of vitamin A on dark adaptation in this infant, 50,000 units of vitamin A in the form of halibut-liver oil were given by mouth, and, as may be noted in the chart, the threshold dropped from 4.7 to 2.7 in 65 minutes. The threshold remained normal for one week and then began to rise, reaching a level of 4.1 two weeks later. A regular diet for a baby of this age (10 months) was then prescribed, and dark adaptation became normal within a few days.

It should be emphasized that throughout this whole period of observation, this baby gained exceptionally well in weight and in height and, despite the fact that he was observed throughout the winter months, he was free of respiratory infections. In view of the fact that this baby seemed normal in every way, we must conclude that there was present a latent or subclinical vitamin A deficiency which became evident only as a result of the dark adaptation tests.

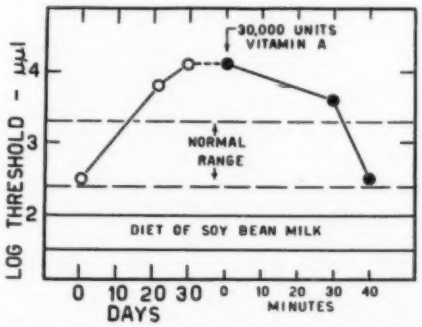

Chart 2.—Effect of a massive dose of vitamin A (30,000 units) on the light threshold of an eczematous infant (B.S.), who manifested poor dark adaptation as a result of a very low vitamin A intake.

In Chart 2 the results of the dark adaptation tests carried out on the other eczematous infant may be noted. This infant (B. S.) was 2½ months of age when the soy bean preparation was prescribed. The threshold rose from 2.5 to 3.6 in 21 days and to 4.1 in 28 days. Administration of large quantities of vitamin A, 30,000 units, brought about a return of the threshold to normal in 40 minutes. In this connection it may be of interest to add that we observed a rapid response to large quantities of vitamin A in an 8-year-old boy who had a high threshold value. This child, who was observed on the Children's Medical Service at Bellevue Hospital, was given 120,000 units of vitamin A by mouth, and the threshold became normal in 35 minutes. The rapid fall in threshold following large quantities of vitamin A coincides with the experience of Wald and his co-workers[8] who observed the same phenomenon in an adult suffering from vitamin A deficiency.

In view of the development of subclinical vitamin A deficiency in a comparatively short period of time in the two eczematous infants receiving the soy bean diet, the question was raised whether infants having eczema are more prone to develop vitamin A deficiency than are normal infants. We therefore placed a normal infant (M. B.), aged 2½ months, on the soy bean diet. In this infant cevitamic acid was used instead of orange juice. As may be noted in Chart 3, the threshold rose from 2.5 to 3.6 in 26 days and reached a value of 4.1 in 53 days and of 4.4 in 60 days. This infant, therefore, developed a latent form of vitamin A deficiency as readily as the eczematous infants. Sixty international units of vitamin A in the form of U.S.P. reference cod-liver oil were then given daily for 37 days. During this period the dark adaptation improved, but, as in the case of the eczematous baby (F. K.), the addition of 120 units was required in order to restore dark adaptation to normal.

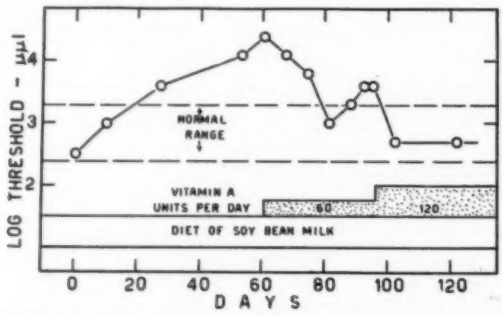

Chart 3.—Effect of daily minimal amounts of vitamin A (60 and 120 units) on the light threshold of a normal infant (M.B.), who developed high threshold values as a result of a very low vitamin A diet.

COMMENT

The data obtained in this study revealed that the minimum light threshold after complete dark adaptation is as low in infants receiving a diet containing only 135 to 200 vitamin A units, as in those receiving a normal diet supplemented by as many as 17,000 vitamin A units. It should also be added that the infants in the low vitamin A group gained just as well in height and in weight and were no more susceptible to infections than those in the high vitamin A group. This would indicate that 135 to 200 units of vitamin A daily covered the minimum vitamin A requirements in these infants. These infants weighed between 5½ and 8½ kg., and the amount of vitamin A which they received per kilogram of body weight was approximately 25 international units.

In this connection it is of interest to add that the amount of vitamin A per kilogram of body weight required to bring about normal dark adaptation in two infants developing high threshold values on the

soy bean diet was 18 and 20 international units, respectively. Daily administration of 10 and 12 units of vitamin A, respectively, resulted in only slight improvement in the threshold levels of these two infants. These curative tests indicate that the infants in the 135 to 200 vitamin A unit group (25 units per kilogram of body weight) were receiving a diet containing an amount of vitamin A which was somewhat in excess of the minimum requirement for vitamin A.

Recently, there have appeared in the literature reports concerning the minimum vitamin A requirement in adults. Thus, Edmund and Clemmesen[10] found that in 14 adults receiving 1,400 international units of vitamin A (20 to 22 units per kilogram of body weight) visual perception was normal; whereas in 14 adults receiving 1,225 units (17 to 19 units per kilogram of body weight), visual perception was not quite normal. In a carefully controlled investigation of 5 adults, Booher and her co-workers[11] found that the daily intake of vitamin A necessary for the maintenance of normal dark adaptation varied between 25 and 55 international units of vitamin A per kilogram of body weight.

In experiments conducted on cattle, sheep, and swine Guilbert and his collaborators[12] reported that 6 to 8 mg. of vitamin A (about 20 to 27 international units per kilogram of body weight) represented the minimum vitamin A requirements for these animals. This dosage of vitamin A was adequate for the promotion of good growth and for the prevention of night blindness. These investigators are of the opinion that vitamin A requirement is dependent on body weight rather than on energy requirement and that 6 to 8 mg. of vitamin A represent the minimum vitamin A requirement for all mammals. Our observations, as well as those obtained on adults, are, in general, in accord with the hypothesis of Guilbert and his co-workers.

Since the infants in the low vitamin A group (135 to 200 units) received a diet containing approximately one-twelfth the vitamin A content of the average diet, it is apparent that there is a large margin of safety in the infant's diet with respect to its vitamin A content. It is for this reason that vitamin A deficiency is so uncommonly seen in infants. The scattered reports of vitamin A deficiency that have appeared in the literature within the past few years involve infants who either had been suffering from a pathologic disorder which interfered with the absorption or utilization of vitamin A, or who had been given completely skimmed milk or proprietary preparations which are used as substitutes for milk, but contain little or no vitamin A.*

*During the past year we have observed two infants, each aged 4 months, who were suffering from vitamin A deficiency despite the fact that their diets had been supplemented by large quantities of vitamin A in the form of percomorph liver oil. One of these infants had xerophthalmia. The diagnosis of vitamin A deficiency was confirmed post mortem when the histologic changes in the epithelial tissues were noted, metaplasia from columnar or cuboidal into keratinized stratified squamous epithelium. In both infants there was found a cystic fibrosis of the pancreas. As a result of the pancreatic lesion, there was presumably an interference in the absorption of vitamin A.

During the past few years increasing attention has been given to the prevalence of night blindness in adults. In view of the fact that adults require many more units of vitamin A than do babies and are more likely to avoid articles of food containing vitamin A, in contrast to infants, whose basic food, milk, is a rich source of vitamin A, it is apparent that adults are much more likely to develop mild forms of vitamin A deficiency than are infants. As judged by dark adaptation, a few ounces of milk alone will cover the vitamin A requirement in infancy.

Of course, it is desirable that infants should receive an amount of vitamin A in excess of the minimum requirement in order to provide for ample storage. This brings up the question of the relationship of minimal to optimal dosage of vitamins. In this connection it is of interest to mention that Macy and her co-workers[13] have recently found that 10 mg. of cevitamic acid (about 20 c.c. of orange juice) represent the minimum requirement for the prevention of scurvy in infants. The generally recommended dosage of vitamin C for infants is 30 to 45 mg. (about 2 to 3 oz. of orange juice), an amount which, according to the aforementioned investigators, is from 3 to 4½ times the minimum protective dose. In view of the fact that the infant's dietary contains at least 12 times as many units of vitamin A as are necessary to prevent the development of vitamin A deficiency as judged by dark adaptation tests, it would, therefore, seem unnecessary to supplement the average diet of infants with special preparations which contain vitamin A.

SUMMARY

The minimum light threshold after complete dark adaptation was determined in 53 infants ranging in age from 1½ to 13 months. These infants were divided into four groups: Group 1 consisted of 26 infants receiving the average infant's diet; Group 2 consisted of 9 infants receiving a diet supplemented by large quantities of vitamin A (17,000 units) in the form of halibut-liver oil; Group 3 consisted of 4 infants, receiving a diet containing approximately one-fourth the vitamin A content of the average diet; and Group 4 consisted of 14 infants receiving about one-twelfth the vitamin A content of the average diet. These diets were given for periods varying from 3 to 10 months. The results of the dark adaptation tests were within normal limits in all four groups of infants. Thus, infants receiving only 135 to 200 vitamin A units daily had as low a threshold for vision in the dark as infants receiving an average diet supplemented by 17,000 vitamin A units. It should also be added that the infants in the low vitamin A group gained weight just as well as, and were no more susceptible to infections than, those in the high vitamin A group. These observa-

tions indicate that 135 to 200 units of vitamin A (approximately 25 units per kilogram of body weight) covered the minimum vitamin A requirements in these infants.

Since the average diet contains approximately 12 times as many units of vitamin A as were contained in our low vitamin A diet, it is apparent that there is a large margin of safety in the infant's diet with respect to its vitamin A content. It would, therefore, seem unnecessary to supplement the average diet of infants with special preparations which contain vitamin A.

Three infants, two of whom had eczema, received as a substitute for milk a proprietary preparation containing soy bean, starch, and olive oil. This product is almost devoid of vitamin A. In 3 to 4 weeks these infants manifested poor dark adaptation. The addition of 120 units of vitamin A in the form of cod-liver oil resulted in normal dark adaptation in two of these infants. Computed on the basis of kilogram body weight this dosage (plus the vitamin A content of the diet) was equivalent to 18 units of vitamin A for one infant and 20 units of vitamin A for the other infant. When a single large dose of vitamin A, 30,000 to 50,000 units, was given to two infants who had developed high threshold values on this diet, a prompt response occurred; dark adaptation returned to normal in 40 minutes in one infant and in 65 minutes in the other infant.

During the period that the three infants on the soy bean diet had poor dark adaptation, they gained well in height and in weight and were no more susceptible to infections than infants receiving large quantities of vitamin A. In view of the fact that these infants appeared normal in every way, we must conclude that they had a latent or subclinical form of vitamin A deficiency which became evident only as a result of the dark adaptation tests.

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THE PLASMA ASCORBIC ACID OF INFANTS AND CHILDREN

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THE discovery of chemical methods for the estimation of ascorbic acid in the blood gave rise to the expectation that this measurement would be of value in the diagnosis of scurvy and latent forms of this disease. Abt and his co-workers[1] stated, "Such a determination accurately indicates the nutritional state of the body relative to vitamin C." Ingalls[2] reported plasma ascorbic acid figures which, based on his experience to date, indicate the state of vitamin C nutrition. He suggested that 0.5 to 2.0 mg. per cent of plasma ascorbic acid is an optimum level; 0.3 to 0.5 mg. per cent is suboptimum; 0.15 to 0.3, asymptomatic scurvy; and 0.0 to 0.15, scurvy. Certain cases with no clinical or x-ray evidence of scurvy were found by us to have no measurable plasma ascorbic acid. We subsequently made a series of measurements of the plasma ascorbic acid in infants and children and later administered ascorbic acid by mouth to determine its effect on the plasma ascorbic acid.

The method for the determination of the ascorbic acid was that described by Jackson.[3] Five cubic centimeters of blood was obtained by venepuncture and put in tubes containing 2 drops of 20 per cent potassium oxalate and 1 drop of 5 per cent sodium cyanide. The cyanide used has been tested and does not change the reading. It is essential that the blood be not hemolyzed. It was observed that excessive suction on the syringe in obtaining the blood or pressure in transferring the blood to the tube from the syringe were the two main causes of hemolysis. In particular the needle should be taken off the syringe when the blood is blown out. The blood was chilled immediately and kept cold until the plasma was separated; separation was complete very shortly after the blood was obtained. The estimation was made on the plasma with the Evelyn photoelectric colorimeter, using dichlorphenol-indophenol.

Plasma ascorbic acid measurements were made on 158 infants and 77 older children shortly after admission to the hospital.

Chart 1 shows the results obtained on 31 breast-fed infants. It is observed that there is no essential difference between the infants receiving orange juice supplement and those fed on breast milk alone. The average of the whole group is .76 mg. per cent. A few of the infants were suffering from infection, and the measurements of this group were of the same magnitude as the whole group.

From the Department of Pediatrics, University of Toronto, and the Hospital for Sick Children, under the direction of Alan Brown, M.D., F.R.C.P.(C).

Read at the annual meeting of the Canadian Society for the Study of Diseases of Children, Alexandria Bay, N. Y., June 16 and 17, 1939.

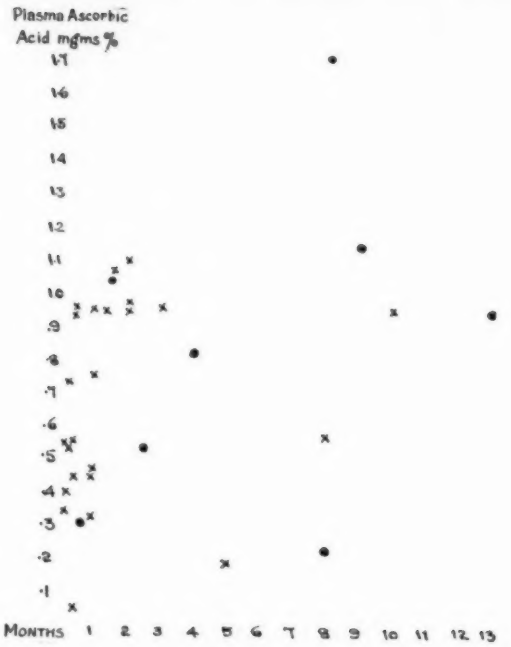

Chart 1.—Milligrams of ascorbic acid per 100 c.c. of plasma in breast-fed infants. (● Indicates supplementary orange juice.)

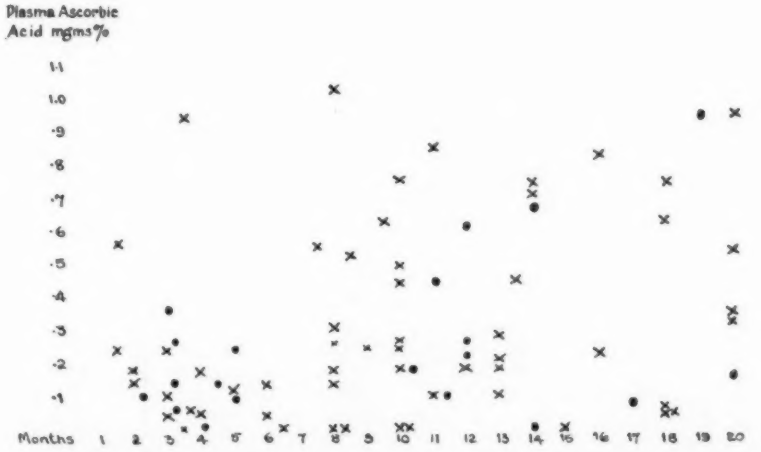

Chart 2.—Milligrams of ascorbic acid per 100 c.c. of plasma in artificially fed infants previously given supplements of 2 oz. or more of orange juice daily (● indicates infants with no infection.)

Chart 2 shows the plasma ascorbic acid measurements on the group of 79 artificially fed infants receiving 2 oz. or more of orange juice daily before admission. There is no difference between the group suffering from infection and those who were free. The average of this group is 0.30 mg. per cent. Practically one-third of this group have measurements of 0.1 mg. or less.

The 48 artificially fed infants receiving little or no orange juice supplement (Chart 3), have an average of 0.12 mg. per cent. Included in this group are 3 infants with scurvy. Two-thirds of this group have measurements of 0.1 mg. or less.

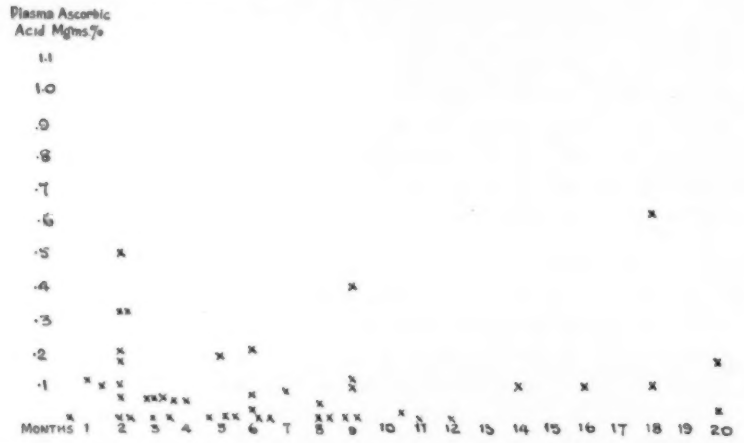

Chart 3.—Milligrams of ascorbic acid per 100 c.c. of plasma in artificially fed infants who had received little, or no, orange juice.

Of the 158 infants, 58 had readings of 0.10 mg. per cent or less, and, of these, only 3 had clinical evidence of scurvy. It is inconceivable, with such a large number of low values, that any interpretation may be made from a low plasma ascorbic acid measurement regarding the presence or absence of scurvy.

TABLE I

AVERAGE PLASMA ASCORBIC ACID ON PATIENTS SHORTLY AFTER ADMISSION TO HOSPITAL

	INFANTS		
CLASSIFICATION	TOTAL	RECEIVING ORANGE JUICE REGULARLY	PLASMA ASCORBIC ACID AVERAGE IN MG. %
Breast-fed	31	8	0.76
Artificially fed	127	79	0.23
Artificially fed, no infection	32	20	0.18
Artificially fed, with infection	95	59	0.23
Artificially fed, regular orange juice	79	79	0.30
Artificially fed, no orange juice*	48		0.12

*Three of these had clinical scurvy.

In summary, 31 breast-fed infants had a plasma ascorbic acid average of 0.76 mg. per cent (Table I); 127 artificially fed infants had an average of 0.23. Of these artificially fed infants, 79 were receiving 2 oz. or more of orange juice supplement daily and had an average plasma ascorbic acid of 0.30 mg. per cent. Forty-eight of the artificially fed infants with little or no orange juice supplement had an average plasma ascorbic acid of 0.12 mg. per cent.

Chart 4.—Milligrams of ascorbic acid per 100 c.c. of plasma in children 2 to 14 years of age on admission to hospital.

Seventy-seven children from 2 to 14 years of age (Chart 4) on admission had an average plasma ascorbic acid of 0.75 mg. per cent. This is higher than that of the artificially fed group and of the same

TABLE II

AVERAGE PLASMA ASCORBIC ACID ON PATIENTS SHORTLY AFTER ADMISSION TO HOSPITAL

CHILDREN, 2 TO 14 YEARS OF AGE		
DIAGNOSIS	NUMBER	AVERAGE PLASMA ASCORBIC ACID MG. %
Respiratory infection	24	0.55
Upper respiratory infection	11	0.79
Rheumatic infection	15	0.87
Renal disease	10	0.73
Diabetes	8	0.96
Miscellaneous	9	0.87
Total	77	0.75

magnitude as that of the breast-fed infants. Table II shows the relation to disease. There seems to be a tendency to lower values with respiratory infection.

Having found such a large number of infants with very low plasma ascorbic acid measurements who showed no clinical evidence of scurvy, we studied the effect of giving ascorbic acid by mouth to 39 infants with low initial values. One of these had very mild scurvy.

TABLE III

EFFECT OF ADMINISTRATION BY MOUTH OF ASCORBIC ACID ON PATIENTS WITH LOW PLASMA ASCORBIC ACID MEASUREMENTS

MG. ASCORBIC ACID DAILY	NUMBER OF DAYS	PLASMA ASCORBIC ACID AFTER INGESTION	
		RAISED	NO CHANGE
100	1	2	2
500	1	8	4
1000	1	5	3
500	2	3	2
500	3	5	1

Fifteen of 24 patients (Table III) with low initial ascorbic acid and no clinical evidence of scurvy showed a definite rise after receiving one dose of ascorbic acid, and 8 of 11 patients showed a rise after administration over a period of two or three days. Examples of the results are shown in Chart 5.

In Chart 6 are shown plasma ascorbic acid curves of four patients receiving ascorbic acid until a definite rise was obtained. One of these was a mild case of scurvy. It is observed that some patients with no clinical or x-ray evidence of scurvy may require a large amount of ascorbic acid to bring the blood level up.

The patient with scurvy (Chart 6) had a very mild form of the disease. The clinical symptoms had disappeared in seven days, but the ascorbic acid measurement at the end of a ten-day period during which 100 mg. was administered daily by mouth was still zero. In all, 3500 mg. were required to bring this patient up to 1.77 mg. per cent. Another patient with severe scurvy showing a definite laying down of bone in the stripped up periosteum over the hemorrhage had an ascorbic acid measurement of only 0.06 mg. per cent at the time when this was first evident.

DISCUSSION

The finding of higher levels in breast-fed infants than in the artificially fed receiving 2 oz. or more of orange juice as a supplement is interesting. Calculating from the reported figures on pooled breast milk,[4] the average breast-fed baby receives approximately 35 mg. daily, and 2 oz. of orange juice equals approximately 30 mg., so that there is not a great difference between the two. Possible reasons are

that breast milk enhances the absorption of vitamin C or that the continuous administration throughout the whole day allows for more complete absorption.

Bakwin[5] has recently reported that the artificially fed infant requires from 75 to 100 mg. of vitamin C daily to get the same blood level as the breast-fed infant. He feels that repeated small doses of vitamin C have a much greater effect than one large dose. He also showed the average vitamin C in the blood serum of infants without infection to be 0.34 mg. per cent.

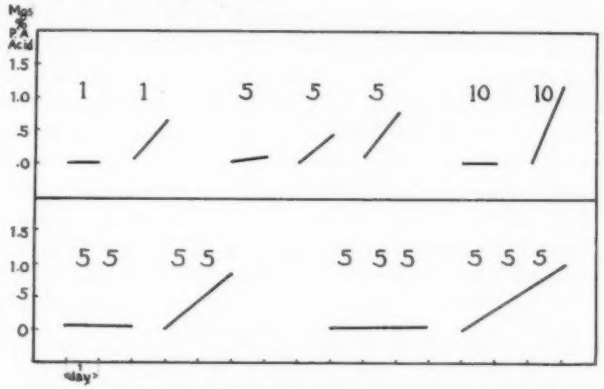

Chart 5.—Examples of ascorbic acid measurements before and 20-24 hours after ingestion of ascorbic acid. (1 = 100 mg. ascorbic acid per day administered by mouth; 5 = 500 mg.; 10 = 1,000 mg.; 15 = 1,500 mg.)

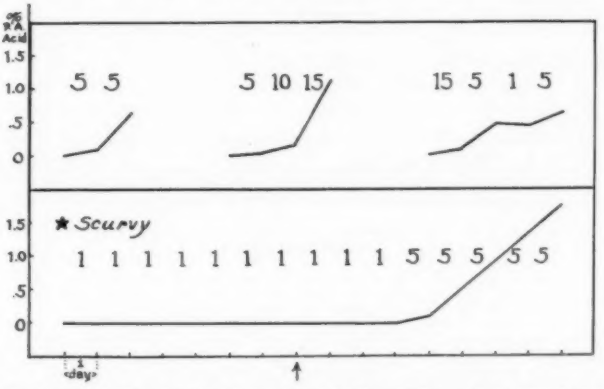

Chart 6.—Records of four patients receiving daily supplements of ascorbic acid until a rise was obtained. (★ indicates a patient with mild scurvy.) (1 = 100 mg. ascorbic acid per day administered by mouth; 5 = 500 mg.; 10 = 1,000 mg.; 15 = 1,500 mg.; ↑, point at which clinical signs and symptoms disappeared.)

The numerous low plasma ascorbic acid values show that there is no justification in the use of this measurement for the diagnosis of scurvy, particularly when the values were obtained in many instances from infants who received orange juice regularly and who had no

clinical manifestations of this disease. A low plasma value is not a sure indication of generalized body depletion of vitamin C and is of no use as a sole criterion for the diagnosis of scurvy. Kajdi and his co-workers[6] recently reported findings to indicate the unreliability of interpreting low blood ascorbic acid measurements by themselves. He reported a tolerance test in which the curve of absorption is followed in the plasma after an intramuscular injection of ascorbic acid.

In support of this assumption that a low measurement does not indicate the state of vitamin C store in the body as a whole, are the results that we obtained by giving ascorbic acid by mouth. The fact that there was a rise in the plasma ascorbic acid after one administration in many of the subjects suggests that the depots in the body were not entirely lacking in ascorbic acid. One patient with very mild scurvy required 3500 mg. (Chart 6) to bring the blood ascorbic acid level up appreciably. In this patient the clinical symptoms and signs had disappeared with the plasma ascorbic acid still at zero. One patient with acute severe scurvy and large hematomas had laying down of bone in the stripped up periosteum, with a blood ascorbic acid measurement of 0.06 mg. per cent. Obviously these patients were undergoing healing, but this was not reflected in the plasma until considerably more ascorbic acid had been administered.

CONCLUSIONS

Breast-fed infants have higher plasma ascorbic acid measurements than artificially fed babies receiving 2 oz. of orange juice regularly. The latter have higher levels than the patients not receiving orange juice or similar vitamin C supplement. Many artificially fed infants have very low plasma ascorbic acid measurements with no evidence of clinical scurvy.

Low plasma ascorbic acid measurements by themselves do not give one the picture of the general ascorbic acid nutrition of the individual and cannot be used as a standard for the diagnosis of scurvy.

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PROBABLE ADRENAL INSUFFICIENCY IN AN INFANT

Report of a Case

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THIS paper presents the case history of an infant, particularly characterized from the age of 2 weeks to his present age of 20 months by:

1. Brownish pigmentation of the skin.
2. Macrogenitosomia.
3. Sudden collapse on restriction of fluids or of added salt in the diet; the collapse being associated with dehydration and low serum sodium and elevated serum potassium concentrations.
4. The urinary excretion of excessive amounts of estrogens and androgens.
5. The maintenance of relatively good nutrition by the addition of from 2 to 3 gm. of sodium chloride plus 1 to 2 gm. of sodium bicarbonate to the daily diet.

The case is of interest because of the difficulty in establishing a diagnosis with certainty, the simplicity and effectiveness of the therapy, and the possible pathologic process that is indicated by the presence of macrogenitosomia and Addison's disease.

The patient's family consists of parents of Canadian-American birth with no foreign or negro blood admixed. Three siblings are living and well; the first-born child died at the age of six months after a chronic nutritional disturbance of which the etiology was unexplained even after complete postmortem studies.

The patient was delivered normally at full term at the Boston Lying-In Hospital. Birth weight was 6 pounds and 15 ounces. During the five days' stay in the hospital the infant ate well and showed no recognized abnormalities. At time of discharge a note was made of increased pigmentation about the genitals. The discharge weight was 6 pounds and 4 ounces. For the next eight days the infant did well at home. He took breast feedings supplemented with a formula eagerly. On the thirteenth day of life the patient became apathetic, refused most of his feedings, and vomited several times. The stools were normal, and there were no signs of infection obvious to the mother. On the following afternoon the infant had a fever of 104° F. and was referred to the Infants' Hospital.

At the time of admission to the hospital the patient weighed 5 pounds and 12 ounces. He was moderately dehydrated, with grayish cyanosis of the lips, signs of bilateral otitis media, and acute bronchitis. There was noticeable brownish pigmentation diffusely over the body, particularly marked about the areolae of the nipples and the genitals. There was no pigmentation of the mucous membranes. There were no abdominal masses or tenderness.

After the administration of glucose intravenously and saline subcutaneously there was moderate improvement in the patient's condition, which was maintained for the

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succeeding five days. On the evening of the fifth day of hospitalization, the infant was found in a state of severe collapse with signs of peripheral vascular failure evidenced by weak, thready pulse and cold perspiration. There were evidences again of moderate dehydration with hemoconcentration. The patient again responded fairly well to parenteral fluid therapy and transfusion and suffered no similar episodes in the next two months. Throughout the first six months of life the infant had frequent febrile episodes with respiratory infections and recurrent otitis media finally requiring adenoidectomy. Throughout fourteen months in the hospital the patient carried pneumococci Type XIV in his nasopharynx without evidence of pulmonary infection other than a chronic bronchitis.

Fig. 1.

During the period of observation there was a slow and unsteady weight gain with a lag approximately 40 per cent behind normal for his age. The body measurements showed a delay only slightly below the lower limits of normal deviation from the mean. Mental development was below normal with an intelligence rating of 70 per cent at thirteen months. The penis at 2 months was noted to be larger than normal. It maintained its disproportionate size during the infant's growth as shown in Fig. 1. The testes appeared small but of normal consistency. The infant showed a persistent structural scoliosis with a left dorsal right lumbar curve, explained by the roentgenographic evidence of a second lumbar hemivertebra.

Repeated x-ray examination of the abdomen failed to show any calcified intra-abdominal masses; the chest showed a persistent increase in peribronchial markings

without definite parenchymal infiltration. Films of the extremities showed epiphyseal growth normal for the age. Gastrointestinal series with barium were normal. Intravenous pyelography revealed adequately the outline of the kidney pelves in normal position.

The blood was repeatedly checked by the Hinton test and found negative. The tuberculin test up to 10 mg. was negative. Blood counts showed usual variations accompanying infection and hemoconcentration in periods of collapse. Development of slight anemia necessitated transfusion on five occasions.

Analysis of the stools for percentage of fat and total nitrogen gave normal values. The urinalysis showed nothing unusual; there was no albuminuria, glycosuria, ketonuria, and no formed elements on microscopic examination. With slight restriction of fluid over periods of eight to twelve hours, the infant repeatedly produced urine of a specific gravity ranging from 1.022 to 1.028. Urea clearance tests done on three different occasions showed clearances varying from 35 to 77 per cent of normal, the lower readings occurring with low urine volumes.

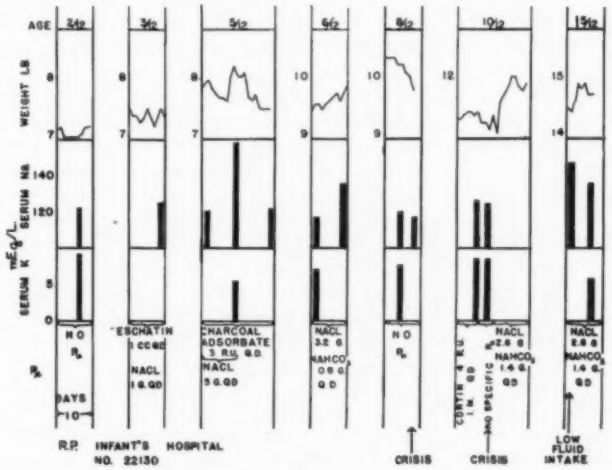

Fig. 2.

Blood pressure readings taken at various times, including periods of moderately severe collapse, were within normal limits varying from 70 to 90 mm. systolic and from 40 to 60 diastolic. Blood sugar readings never showed hypoglycemia, even at the height of dehydration and collapse. Repeated glucose tolerance tests gave curves which tended to be flat.

The variations in the patient's weight and in the concentrations of serum sodium and potassium with varying therapy are represented in Fig. 2. In the first period, with the patient on a formula suited to his age and with no specific therapy, there was little change in weight; the serum sodium remained low, and the potassium, high. Following a period of therapy with 1 gm. of sodium chloride added to the usual daily diet and 1 c.c. of Parke, Davis eschatin, intramuscularly, daily, there was no change in the status of the patient. By the addition of 5 gm. of sodium chloride and a charcoal adsorbate of adrenal cortical extract containing 3 rat units daily, the patient gained weight without any evidence of edema or decrease in serum protein. The serum sodium and chloride concentrations rose to levels above normal, while serum potassium fell to a level just above normal. When the sodium chloride was discontinued, the adrenal extract alone was not adequate to maintain

body weight or blood levels. The patient could be maintained in status quo by use of potent parenteral cortical extract* providing 4 rat units daily. Only by use of large quantities of sodium and chlorine added to the diet in the form of a mixture of sodium chloride, 2.6 gm., plus sodium bicarbonate, 1.4 gm., could moderate weight gain and relative improvement in plasma levels of potassium and sodium be maintained.

In preparing the infant for intravenous pyelography by restricting fluids without reducing total salt intake, signs of impending collapse were observed in vomiting, restlessness, and beginning dehydration. Blood sodium concentration at that time was 145 meq. per liter, with nonprotein nitrogen 68 mg. per cent. This is similar to the findings reported by Willson and Sunderman (1939) in a patient with Addison's disease undergoing water deprivation.

Since the age of 2 months when extra salt was first added to the patient's daily intake, it has required either salt or a potent adrenal cortical extract to maintain a relatively good state of health. On six different occasions when neither additional salt nor adrenal cortical extract was being given, within forty-eight hours the infant refused feedings, vomited, became listless, and six to ten hours after the onset of symptoms showed the picture of collapse seen originally at the time of the patient's admission.

Serum chlorides have paralleled the concentrations of serum sodium; nonprotein nitrogen of the blood has followed the levels of potassium with readings below 35 mg. per cent only when the chloride, sodium, and potassium levels were normal.

An attempt was made to follow the test for Addison's disease suggested by Cutler, Power, and Wilder (1938), but, because of the danger of restricting salt in the diet, the plan outlined by these authors was not practicable. However, the patient, when on a normal food intake without added salt, excreted a twenty-four-hour quantity of urine with a concentration of sodium of 69 and of chloride of 60 meq. per liter. At that time, the level of serum sodium was 124, and serum chloride, 103 meq. per liter. The figures are suggestive of an abnormally high concentration of sodium and chloride in the urine, such as occurs in Addison's disease. This short period of exclusion of added salt resulted in a severe collapse. A normal child of the same age on a similar diet with normal serum concentrations of sodium and chloride excreted urine with a sodium concentration of 50 and chloride of 55 meq. per liter. This suggestive evidence for adrenal insufficiency should be considered cautiously, because Winkler and Crankshaw (1938) showed that patients suffering from chronic debilitating intrathoracic disease may show low concentrations of serum chloride and sodium and high levels of urinary chloride excretion. These patients, however, were receiving added salt in the diet.

The urinary excretion of estrogens and androgens was determined, respectively, by the methods of Astwood (1938) and of Talbot and Langstroth (1939). In two twenty-four-hour periods the average daily urinary estrogens were 38 international units. In a single twenty-four-hour period the urinary excretion of androgens was 65 "sterone" units. These values approximate those found in adults and are far in excess of the very small amounts of androgens and estrogens excreted by normal patients of this age.

Wilkins and Fleischmann (1939) at the same meeting in which this case history was presented reported the case history of a patient with macrogenitosomia associated with adrenal insufficiency. Their patient had a sudden fatal collapse on withdrawal of extra salt from the diet and had a low plasma sodium and an abnormally high urinary excre-

*Adrenal cortex extract (Upjohn), which was kindly supplied by the Upjohn Company.

tion of estrogens and androgens. Postmortem examination revealed a persistence of the fetal cortical zone of the adrenal glands and a testicular tumor consisting of cells morphologically similar to the cells of the fetal adrenal cortical zone. The similarity between their case history and ours suggests that our patient may have a similar pathological development of the adrenal glands.

We know of no other data relevant to the prognosis of our patient. Conceivably a persistence of the fetal adrenal cortex may result in an aggravation of his pathologic physiology. On the other hand, a transition to a normal adrenal cortex might bring about a gradual alleviation of the syndrome. Ingle and Kendall (1937) showed that the injection of relatively large amounts of adrenal cortical extract into rats resulted in atrophy of the adrenal cortex. Because the administration of desoxycorticosterone to our patient in doses adequate to control his symptoms might possibly impede the development of normal cortical function, we have postponed such therapy until after a further period of observation.

SUMMARY

The patient reported here shows poor physical development, low grade respiratory infection, hyperpigmentation of the skin, and macrogenitosomia. His weight gain, maintenance of reasonable health, and probably life are dependent upon the addition of relatively large quantities of sodium chloride plus sodium bicarbonate or a potent adrenal cortical extract to his daily intake. Withdrawal of such therapy leads to signs of collapse similar to those seen in Addisonian crises. At such times the patient shows serum sodium and chloride concentrations far below normal levels with striking elevations in serum potassium and nonprotein nitrogen. In the absence of demonstrable renal insufficiency, the pigmentation, the crises, the changes in serum sodium and potassium concentrations, and high urinary sodium and chloride excretions suggest the diagnosis of Addison's disease. Moreover, these findings associated with a macrogenitosomia and a high urinary excretion of estrogens and androgens suggest that there is an abnormality in the adrenal cortex, characterized by persistence and hyperplasia of the fetal type of cortex and underdevelopment of the adult type of cortex.

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THE PLACE OF ENCEPHALOGRAPHY IN PROGNOSIS IN CHILDHOOD

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ENCEPHALOGRAPHY is almost universally accepted as a tool for localizing surgical lesions within the cranium and in establishing a diagnosis in certain relatively static conditions involving the central nervous system. The diagnostic value of the procedure[1-4] is not considered in this communication, but we wish to report a few illustrative cases which suggest that it is entirely possible to make serious errors in prognosis if caution in interpretation is not rigidly maintained.

Although Crothers and his associates[3] stated in 1930 that "we are unable and unwilling to make a diagnostic or prognostic decision on the basis of encephalograms alone," there has been an increasing tendency to emphasize the encephalographic findings in formulating a prognosis. It is quite possible that this tendency is based upon the usual conception that, after the initial insult, there remains a static or even a progressive lesion. Indeed, the earlier papers specifically referred to the changes observed by encephalography as "fixed lesions." However, there is convincing evidence (in children at least) that actual growth of brain tissue does take place, as evidenced by diminution in the size of the ventricles and increase in brain bulk on subsequent examination. This fact is emphasized by Wyatt and Carey,[5] who observed a case of hereditary neurosyphilis in which encephalograms, taken at the age of 6 months, suggested a degree of cortical atrophy and ventricular enlargement which left no doubt in the minds of all those who saw the case that the situation was hopeless. After eighteen months of antisyphilitic therapy, the child was "up to age" by psychometric examination. A second encephalogram at 21 months showed persistence of ventricular enlargement, but the amount of brain tissue had increased relative to the size of the skull.* There is no question in this instance that appreciable growth of brain tissue had occurred. The prediction of the child's mental adequacy must depend on the future rate of development.

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We are indebted to Dr. Bronson Crothers for his assistance in the collection and presentation of this material.

*The reader is referred to page 13 of the paper by Crothers, Vogt, and Eley[3] for a statement on the relative reliability of the ventricular shadow as compared with that of the subarachnoid.

DISCUSSION OF CASES

During a ten-year period, six patients have come to our attention for whom an unfavorable prognosis was given chiefly on the encephalographic findings. The salient features in this series of cases are as follows:

Three of the six children (Cases 1, 2, and 3) were studied because they had failed to develop normally. Of these three, one child (Case 1) is at present making "satisfactory" progress. The other two are honor pupils at school.

Two of the six patients (Cases 5 and 6) were admitted for study because of convulsive seizures, but both of them were mentally "up to age." When last tested they were above average.

Case 4 deserves separate consideration. The girl was apparently developing in a normal manner until she suffered a head injury. This was followed by convulsions, hemiparesis, and severe mental retardation. Repeated observations over a period of five years revealed a gradual return to a normal mental status.[6]

The average period of observation for the group was about five years or longer. In each case the age of the child at the time of encephalography was 3 years or under. In all these patients the blood Wassermann or the Hinton reaction was negative, and the cerebrospinal fluid was normal. Although the anesthesia or sedative varied, the procedure of air injection by the spinal arachnoid route was essentially that employed routinely in this clinic.*

An estimation of the developmental status was based on: (1) the routine developmental history obtained at the time of admission; (2) the impressions of the staff members during the period of observation or at the time of the follow-up visit; (3) reports on progress by the parents or school authorities; and (4) psychometric examination.

CASE REPORTS

CASE 1.—P. C., 3½ years old, was admitted Nov. 15, 1928, because of delayed speech and other evidences of retardation. The family history was irrelevant. The patient was delivered prematurely by induced labor because of the rapid development of a severe toxemia in the mother. The birth weight was 3 pounds, 7 ounces. There were no postnatal disturbances, and he grew and developed in a satisfactory manner. The adenoids and tonsils were removed at 2½ years of age because of frequent upper respiratory infections. From this time until admission, he had been rather "sickly."

On admission he was described as a thin, pale child who played quietly but without particular interest. No other physical defects were noted. The neurologic examination was negative.

*In a study of younger infants, we have, as a rule, limited the use of encephalography to those babies who were obviously "unsatisfactory." A complete discussion of encephalography in relation to contraindications, fatalities, and interpretation may be found in *The Normal Encephalogram* by Davidoff and Dyke, published by Lea & Febiger, Philadelphia, 1937.

The encephalograms (Fig. 1) showed considerable enlargement of both lateral and third ventricles. The fourth ventricle was well delineated but not notably dilated. The body and anterior horn of the lateral ventricles were particularly dilated. There was no appreciable air over the periphery.

A psychometric examination was made at the time of admission (age 3½ years). Using the Gesell schedule, his adaptive behavior and comprehension of language were rated at 2 years. The patient had a vocabulary of a few words which he used infrequently. He made only an occasional effort to imitate words. His developmental rating was "about 60."

Progress.—Five years later at the age of 8 years and 8 months, psychometric examination was made, and it was found that his mental age was 8 years, 4 months. His intelligence quotient was 95. The last report of this patient showed that he was in the fourth grade (age 9 years). His percentile rank was 68, and he was rated as "good in the language field."

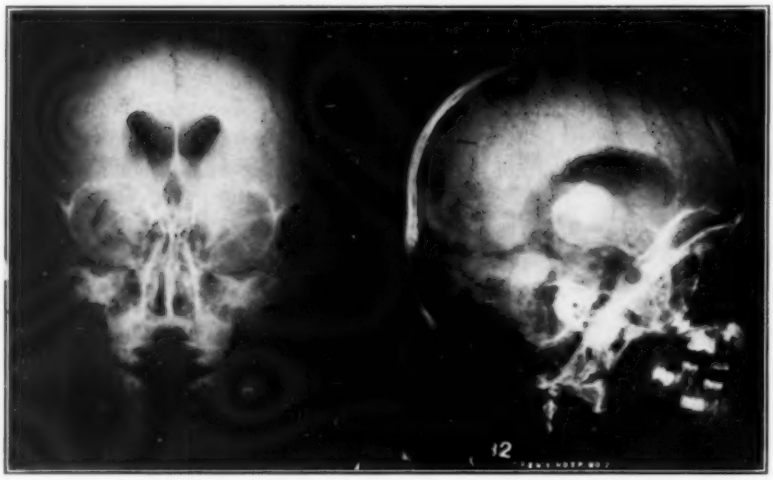

Fig. 1.

CASE 2.—K. S., at the age of 20 months, was admitted Feb. 26, 1934, because of retarded development and unusual drooping of her upper eyelids. The family history was noncontributory. The patient was born at full term after an uneventful pregnancy. Labor lasted 7 hours. Low forceps were used. Birth weight was 8 pounds and 6 ounces. There were no postnatal difficulties. Breast feedings were taken well up to 6 months of age, and gain in weight progressed normally. At 4 months of age the parents thought the child was less active than she should be. At 6 months of age she was taken to a local physician who treated her with thyroid extract up to 6 gr. daily over a period of six months without appreciable effect. She sat up at 6 months. She walked with support and talked in short sentences at 20 months.

On admission, the physical examination showed a well-nourished girl with unusual facies. Her eyes were widely spaced. Her nose was thick. Her upper eyelids drooped so that she had to tilt her head back to see. There was a slight right external strabismus. Subsequent examination of the eyes by opthalmologists showed her to have, in addition to her ptosis, a considerable amount of nearsighted astigmatism in the horizontal meridian and a disturbance of pigment in both the

retina and choroid. There was a short systolic murmur at the left sternal border in the third interspace, interpreted as due to a congenital defect of the heart. Muscle tone was slightly below par. The deep reflexes were generally somewhat hyperactive but symmetrical. No other abnormal neurologic findings were made out.

The encephalograms (Fig. 2) showed well outlined and quite markedly enlarged lateral and third ventricles. The right lateral ventricle was slightly larger than the left. There was no air over the periphery. No psychometric examination was made at this time.

Progress.—She was seen by Dr. Bronson Crothers at the age of 3 years and 8 months. He stated: "This child's mental status far exceeds my expectations. . . . From my conversation with her, she seems to be thoroughly competent. I have never happened to see ventricles of this type associated with as adequate intelligence as the child shows. She will have to have special concessions from the ophthalmologic aspect alone."

Fig. 2.

At 4 years and 5 months of age, her mental age was 4 years and 4 months. Her I.Q. was 98. No marked irregularities were noted. She entered kindergarten at the age of 5 years, and the first grade, at 6 years of age. In the B division of her first grade class, she has been an honor pupil and frequently receives A-plus grades.

CASE 3.—C. G., a 16-month-old female infant, was admitted Nov. 30, 1931, because of "failure to develop at a normal rate." The family history was noncontributory. The mother's pregnancy was uneventful. The baby was delivered at full term by low forceps. No postnatal difficulties occurred. She had had no illness of importance. A supernumerary small toe was removed during infancy. In addition, she had been found to have a small opening, probably that of a congenital auricular sinus, on the pinna of the left ear.

Physical examination revealed a big, obese baby, with large head profusely covered with hair. The anterior fontanel was open two fingerbreadths and was depressed. She had no teeth. A growth of fine dark hair was present over the mons pubis. Neurologic examination showed no abnormalities. Roentgenograms of the lower extremities showed some evidence of atrophy, probably due to disuse. The cranial vault was thin.

The encephalograms showed considerable enlargement of the lateral and third ventricles and a large amount of air in the subdural spaces.

No psychometric estimation was made at the time of admission to the ward, but it was the general impression of the staff that the patient was obviously retarded.

Progress.—When she was 1 year and 11 months old her parents reported that she had been walking for two months. She was not talking but seemed to understand. At the age of 5 years and 9 months her mother reported that she seemed intelligent. She had learned to count, name colors, and print her name. In examination she drew "a man" with head, legs, arms and "five fingers." Her chronologic age was 5 years and 9 months. Mental age (Stanford) was 5 years and 8 months. Her I.Q. was 98.

She entered a small private kindergarten at the age of 6½ years. Before entering public school she was given a psychometric test by the school psychologist and was placed in the second grade. According to her last report she was in the third grade, receiving all A's.

Fig. 3.

CASE 4.—C. Y., at the age of 2 years and 9 months, was admitted Sept. 11, 1933, because of impaired speech and a paresis of the right arm and leg, which occurred after a fall out of bed 6 months before entry. Her birth history and early progress were uneventful. She walked at 1 year of age, "talked well" at 2 years and 4 months. Just before the onset of her present illness, she was said to be putting words together to form phrases. The patient was apparently normal until the third day after her fall, when she suddenly went into a series of convulsions lasting several hours and followed by left facial weakness, right hemiparesis, and loss of speech. In the month or two before admission she had begun to regain her speech and the facial paralysis improved rapidly, but her right arm and leg remained useless.

On physical examination she appeared to be well developed and well nourished. No facial weakness was noted. When supported, she tended to walk with a scissors gait, her right leg bent at the knee and her foot held in extension. She held her right arm stiffly at her side. The right Babinski response was positive.

The encephalograms (Fig. 3) showed a definite asymmetry of the lateral ventricles. The right one was approximately normal in size; the left was dilated to a moderate degree.

On the tenth hospital day a trephine operation was done on the left side. Nothing was found posteriorly, but in the frontoparietal area, a large amount of cerebrospinal fluid was obtained from the subarachnoid space. No hematoma was found. Air was injected, and a large space in this region was subsequently demonstrated by roentgenograms.

The developmental history obtained on admission seemed to indicate that the patient had been progressing normally up to the time of her accident 6 months before.

Psychometric examination at the time of entry (age 2 years, 9 months) showed her ability in performance tests to be at an 18 to 21 months level. She had a small vocabulary of single words. She understood direct requests related to routine situations and pointed to familiar objects in pictures. Rating for language was 21 to 24 months.

Fig. 4.

Progress.—Re-examination at 3 years and 1 month of age placed her performance at 18 to 24 months. She was beginning to put words together. In answering questions she was more consistently like a 2-year-old child. At this time her developmental rating was below 70.

The patient was last examined at the age of 7½ years of age. Her mental age was 7 years, 8 months. Her I.Q. was 102.

She entered the third grade at the age of 7 years and 9 months and was carrying the work of the grade with only minor concessions to her physical handicap.

CASE 5.—W. B., age 3 years and 3 months, was admitted Feb. 5, 1931, because of recurrent convulsions. Four siblings were living and well. There was nothing unusual in the birth history or neonatal course. He had had almost no cod-liver oil nor orange juice until he was 1 year old. Raw cow's milk was used in his formula for the first 3 years. No illness of note had occurred up to the onset of his seizures. His lower incisors appeared at four months. He walked alone at 15 months of age

and said a few words at 18 months. Two and one-half months before admission, the patient was found in a generalized convulsion which lasted from 6 to 7 minutes. Two days later, and for several days thereafter, he had repeated attacks, as many as fifty occurring in one day. Up to the time of admission he had had three series of attacks of diminishing severity and frequency, lasting a few days at a time. On a few occasions the right side seemed to be more affected than the left.

Physical examination revealed a fairly well-developed and well-nourished boy with frequent mild generalized convulsions. Examination of the eyes and eye-grounds showed no abnormalities. All of the reflexes seemed hyperactive but symmetrical. There was a poorly sustained ankle clonus on both sides. No abnormalities of motion or sensation were noted.

Encephalography (Fig. 4) showed the lateral and third ventricles to be quite markedly enlarged, the left being somewhat larger than the right. There was a moderate amount of air in the subarachnoid spaces.

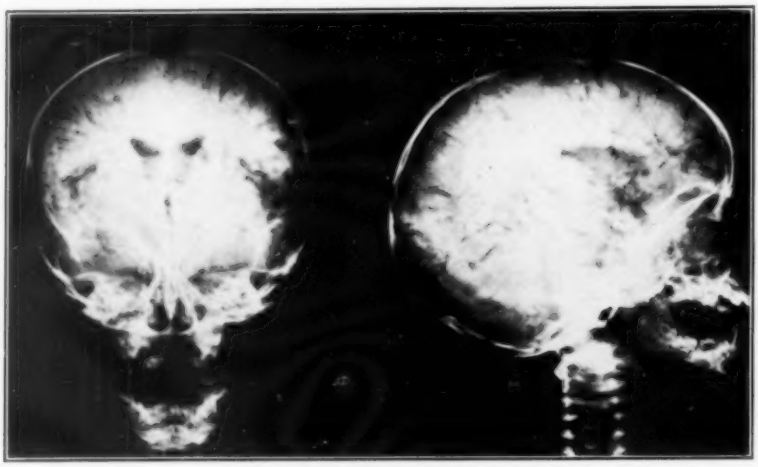

Fig. 5.

One month after admission, the patient was transferred to the surgical service for a left bone flap operation. Definite evidence of an old injury to the arachnoid and shrinking of the convolutions was found. The patient's postoperative condition was poor enough to require transfusion. His convulsions ceased abruptly 9 months after discharge.

Shortly after admission, at the age of 3 years and 3 months, an attempt at psychometric study was made, but the patient was irritable and would not play with the test material. However, he answered questions as well as the average 3-year-old child.

Progress.—He was again seen at 7 years of age. His Stanford-Binet rating was then over 100. His last examination at 8 years and 1 month showed a mental age of 8½ years and an I.Q. of 117. He was doing good work in the third grade.

CASE 6.—J. M. was admitted Jan. 29, 1934, because of recurrent convulsions. At that time he was 9½ months old and had been having attacks over a period of six weeks. His mother was said to have had a convulsion at the age of 7 years, as well as frequent vomiting and fainting during her pregnancy. His maternal grandfather was said to have died of "locomotor ataxia." Delivery was at full

term by midforceps after a 6-hour labor. There were no postnatal complications. Breast feedings were taken well. He had had no illness of note. He sat alone at 5 months of age. During the two or three weeks before admission, at 9 months of age, he had been walking with support and could pull himself up to a standing position by holding on to the furniture. Six weeks before admission he began to have petit mal seizures in which he cried out and was then limp and comatose from one-half to three hours. This was occasionally accompanied by vomiting. There were eleven attacks prior to his admission.

Physical examination showed no abnormalities. The fundi and reflexes were normal. The anterior fontanel was almost completely closed. On the ward he proved to be a friendly, bright, and attractive baby.

The encephalograms (Fig. 5) showed moderately enlarged, symmetrical ventricles. There seemed to be a moderate excess of air over the periphery and some separation of the sutures.

At the time of entry, 9½ months of age, psychologic appraisal showed that his general response to test material was that of a 9- to 10-month-old infant.

Progress.—Following discharge the petit mal attacks gradually became much less frequent and less severe, and they ceased entirely when the boy was 3½ years old. At 3 years and 4 months he seemed bright and asked and answered questions intelligently. He was brought into the Medical Outpatient Department at the age of 5 years and 8 months. At this visit his mother was particularly anxious to know why he had been given a bad prognosis.

At 6 years and 1 month of age, his mental age was 6 years and 10 months. His I.Q. was 112. He was eager to start school and already could print his name and recognize figures.

CONCLUSIONS

Serious errors in predicting the subsequent mental age of children under 3 years of age may result from the interpretation of an encephalogram unsupported by other means of estimating the mental status of a given patient.

The suggestion is made that the encephalographic standards in infants are relatively unreliable and that more knowledge is needed as to the resumption of growth and development after disease or cerebral injury.

The major warning is that a single encephalogram is an inadequate tool for prognosis.

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300 Longwood Avenue

ARACHNODACTYLY

Report of a Case With Autopsy, Including Histologic Examination of Eye

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In 1896 Marfan,[1] under the terms *pieds d'aragne* (spider feet) and *dolichostenomelie*, first described the syndrome characterized principally by abnormally long, slender bones of the hands and feet. Méry and Babonneix[2] in 1902 re-examined Marfan's patient and, because of the x-ray findings of epiphyseal activity, suggested the term hyperchondroplasia. Achard,[3] also in 1902, describing a case similar to that of Marfan's, employed the term arachnodactyly (spider digits). Pfaundler[4] in 1914 used the term *acromakrie*, but this received little recognition. Weve[5] called the condition congenital mesodermal dystrophy, but in common with many other authors referred to it as Marfan's syndrome.

Cases continued to be described in the European literature, but it was not until 1926 that Piper and Irvine-Jones[6] contributed the first paper on this subject in the American literature. Since then, there have been several articles appearing mainly in journals devoted to ophthalmology.

The syndrome consists of the following constant symptoms:

1. Marked elongation and thinness of the long bones, especially those of the hands and feet.
2. Underdeveloped and hypotonic musculature of the entire body.
3. Decrease of subcutaneous fat tissue.
4. Elongation of tendons and laxity of ligaments, with resultant hypermobility of joints.

Less frequently found are the following:

5. Bilateral dislocation of the lens (ectopia lentis), tremulous irides (iridodonesis), and contracture of the pupils with failure of the normal dilatory response to atropine.
6. Dolicocephaly, enlargement of the ears, prominent supraorbital ridges, pointed chin, and aged facies.
7. Deformities of the thorax and extremities.
8. Congenital heart disease.

Our interest in this condition was stimulated by the following case which came under our observation shortly after birth and was seen at intervals until death. As far as we can determine, this is the first instance in which an autopsy, including a complete examination of the eye, has been reported.

From the Sarah Morris Hospital for Children of the Michael Reese Hospital.

CASE HISTORY

C. N., a male negro infant, was born prematurely at the Provident Hospital in Chicago, June 17, 1933, weighing 2340 gm. The recorded cause of prematurity was placenta previa. When the infant was 9 days old, his weight dropped to 2005 gm., and he was transferred to the premature station at the Century of Progress. The measurements at this time were as follows: length, 45.5 cm.; occipitofrontal circumference, 29.5 cm.; chest circumference, 27.5 cm.; shoulder circumference, 28.5 cm. On examination, it was noticed that the infant appeared unusual—the face was long and narrow with a pointed chin, the ears were large and soft, and the hands and feet were markedly elongated and flaccid. The progress of the infant was uneventful, and he was discharged at one month of age, weighing 2540 gm.

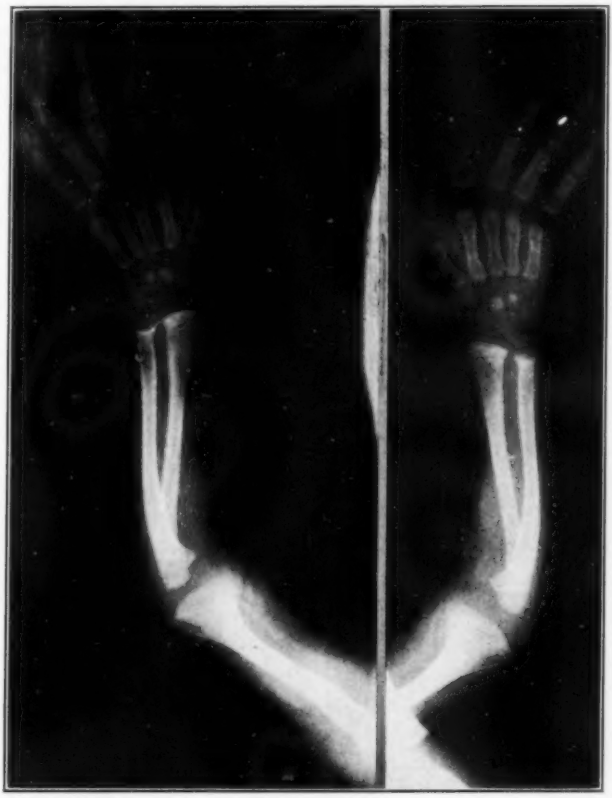

Fig. 1.—X-ray picture of upper extremities at age of 5 months, showing marked elongation of fingers.

He was next seen in the out-patient premature clinic at Michael Reese Hospital at the age of three months, when he presented the picture of florid syphilis—scaly hands and feet, enlarged liver and spleen, bloody snuffles, and generalized lymphadenopathy. At this time the infant's blood Wassermann and Kahn were 4-plus. The blood findings were red blood cells, 4,560,000; hemoglobin (Sahli), 83 per cent; white blood cells, 12,000; lymphocytes 41 per cent; polymorphonuclears, 57 per cent; eosinophiles

2 per cent. The Wassermann of the mother at this time was negative, although the Kahn reaction was 2-plus. She had no treatment during pregnancy. The Wassermann and Kahn reactions of the father were negative. Antisyphilitic therapy with stovarsol was administered to the infant according to the Bratusch-Marrain method. The clinical findings rapidly disappeared, and after nine weeks of therapy the Wassermann and Kahn reactions were both negative and remained so thereafter. Roentgenograms of the long bones made at this time were negative for syphilis, but showed slight flaring and slight cupping "suggestive of rickets." The bones were all elongated and thinner than normal (Fig. 1). At five months, a marked pigeon-breast was first noted. During this entire period the baby gained slowly, and appeared undernourished. At six months, the family moved and could not be traced. The baby weighed 4765 gm. at this time.

Fig. 2.—Photograph of patient showing emaciation, pigeon chest, long, thin extremities, pes cavus deformity, and difficulty in standing.

At the age of 26 months he was brought to the Sarah Morris Hospital with scabies. Because of his peculiar and striking appearance (Fig. 2), he was admitted for observation. The outstanding findings on examination follow: The face was aged and unusually long, with pointed chin and prominent supraorbital ridges. The ears were large and soft; the extremities were long and narrow, the fingers and toes especially elongated, thin and pencil-like. There were contractures of the elbows and knees, marked genu valgum being present. The feet had a definite cavus

deformity and were maintained in an equinovarus position. Extreme hypotonia of the muscles of the extremities and hyperextensibility of the hands and feet were found on examination. Severe dorsolateral scoliosis and marked pigeon-breast deformity were obvious on inspection. The heart sounds were normal and there were no murmurs. Measurements of the heart size was impossible because of the marked chest deformity. The abdomen was not abnormal. The measurements at this time were as follows: height, 41 in.; pubis to vertex 21 in.; pubis to heel 20 in.; circumference of head, 19⅞ in.; circumference of chest, 22 in.; span of arms 41½ in.

Eye Examination.—The lids, lashes, and conjunctivae appeared normal. The corneae were clear and of normal size and transparency. Both pupils were miotic and neither responded to dilatation of the slightest degree with mydriatics. Iridodonesis was slight but noticeable. The lenses were displaced upwards and temporally. The media were clear and the fundi showed no abnormalities. Visual acuity, visual field, and diplopia tests could not be made because of the child's age. Tactile tension was normal, and no attempt was made to record tension with the Schiötz tonometer.

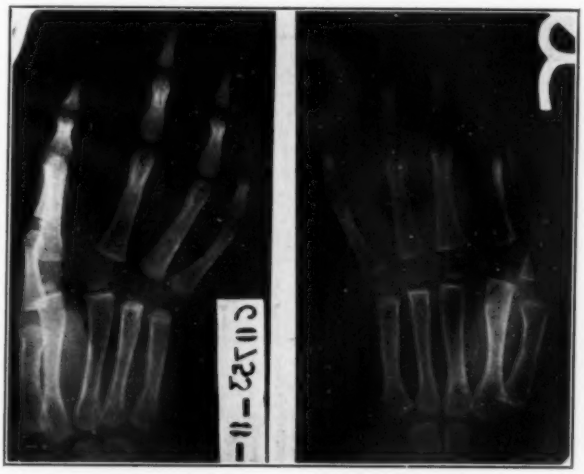

Fig. 3.—X-ray of hand showing marked elongation of fingers; note parallelism of metacarpal bones.

Developmental History.—The first tooth erupted at the age of 6 months. The parents maintain that the patient began to walk alone at 18 months, although at no time during his hospital stay did he make an effort to stand or walk alone. The parents also insisted that the child was able to speak in short sentences, although at no time during the period of observation was he heard to utter an intelligible sound. He was entirely untrained in excretory functions. It was impossible to make a psychological examination because of the lack of cooperation, but it was the general impression that the child was retarded mentally.

Family History.—The paternal family revealed nothing unusual, save that all members were large. When the child was born the father was 40 years old. The paternal great-grandfather was white. The mother was 28 years old at the child's birth. Three of five of her maternal aunts "have all had bad eyes" (difficulty in vision) since early childhood. There were two siblings, a male aged 10, and a female aged 6. Due to lack of cooperation, these children were not examined, although the social worker stated that the children were normal in appearance.

Laboratory Findings

Blood count on entry to hospital showed red blood cells 4,090,000; hemoglobin, 70 per cent (Sahli); white blood cells, 11,500; lymphocytes, 25 per cent; neutrophiles, 70 per cent; eosinophiles, 2 per cent; transitionals, 3 per cent. Subsequent blood counts showed no remarkable deviations from normal. The blood Wassermann and Kahn tests were negative. Blood calcium was 11.2 mg.; blood phosphorus, 4.5 mg.; blood sugar, 57 mg.; nonprotein nitrogen, 32 mg.; uric acid, 4.5; cholesterol, 227 mg. Repeated determination of the blood chemistry showed no significant changes from the above. Sugar tolerance test: fasting 60 mg.; 30 minutes, 77 mg.; 90 minutes, 92 mg.; 2½ hr., 87 mg. Urine examinations were consistently negative. Total creatinine in urine, 107 mg. per volume of 280 c.c. Creatine 130 mg. per volume of 280 c.c. Prolan determination of urine showed less than 2 rat units; estrin determination, less than 4 rat units. Spinal fluid examination gave the following results: fluid, clear; 4 cells, lymphocytes; pressure, normal; Pandy and Ross-Jones tests, negative; Wassermann, negative; Lange curve, 0011221000.

Fig. 4.—X-ray film of spine showing marked scoliosis.

Roentgenologic Examination.—The bones of the hands and feet appeared unusually elongated for a child of this age (Fig. 3). There appeared to be excessive calcium deposition along the metaphyseal zone in all the long bones visualized. In addition, the bone ends were widely flared, and the bone length, for a patient of this age, appeared increased.

Skull.—The calvarium appeared unusually angular and the vertical diameter was increased. The sella turcica was of normal size and shape.

Lumbar Spine.—A marked rotary scoliosis, toward the left, was present, with architectural deformity, the result of mechanical stress (vertebral body wedging) (Fig. 4).

A radiolucent area on the medial surface of the distal end of the left radius, just proximal to the metaphysis, suggested an unossified chondromatous deposit.

The patient was discharged two months after entry. Six weeks later he was readmitted, acutely ill with bronchopneumonia. Four days later, he developed chicken pox and was transferred to the contagious division of the Cook County Hospital, where he died two weeks later.

POST-MORTEM EXAMINATION

(By Dr. Richard Jaffe)

The length of the body was 103 cm., and the weight, 13 kg.

Anatomic diagnosis: Pneumonia of right middle and both lower pulmonary lobes; chicken pox; arachnodactyly; marked cloudy swelling of the liver, kidneys, and myocardium; and edema of the brain.

External Findings.—Apart from the lesions of chicken pox, these were the same as have been described under the clinical examination. The fingers were unusually long, slender, cylindrical. On the right hand, the first finger was 52 mm. long; 2nd, 61 mm.; 3rd, 67 mm.; 4th, 57 mm.; and 5th, 46 mm. On the left hand the measurements were 55, 61, 71, 66, and 46 mm. Toes were long: right foot, 42, 40, 32, 21 and 20 mm.; left foot, 40, 35, 25, 17 and 20 mm.

Abdominal Cavity.—Midline fat was 2 mm. thick. Stomach and intestine were distended. Liver at xiphoid and costal arch. Lower pole of spleen at costal arch, in anterior axillary line.

Pleural Cavities.—Diaphragm, right—fourth rib; left—third rib. Left cavity was free of fluid; right contained 50 c.c. of clear yellow fluid. The thymus weighed 11 gm. and was soft, pale, purple-gray. The pericardial sac contained 10 c.c. of pale gray fluid. The heart weighed 115 gm., and the left ventricle measured 10 mm.; right ventricle, 3 mm.

The epicardium was smooth, apex formed by both ventricles; the myocardium light, pale brown. The left ventricle was dilated, 5½ cm. in transverse diameter and 6 cm. in vertical diameter.

The aorta measured 47 by 20 by 15 mm.; the intima was smooth.

The arteries: pulmonary artery measured 57 mm. and its intima was smooth. The coronary arteries had smooth intimas.

Lungs: The right lung—upper lobe crepitant; middle and lower lobes firm, noncrepitant. On section the upper lobe was light purple-gray and moist. The middle and lower lobes were darker purple-gray and very moist. The lymph nodes at hilus measured up to 15 mm. and were soft, moist, and dark, purple-gray. The mucosa of the bronchi was pale gray. The left upper lobe was crepitant, purple-gray and moist, and the lower lobe, subcrepitant, darker purple-gray and very moist.

The thyroid weighed 5 gm. and was soft, light purple-gray.

Stomach: Mucosa was pale, yellow gray. The folds were indistinct. Mesenteric lymph nodes measured up to 15 mm. in greatest diameter.

The spleen weighed 50 gm. and was moderately firm; the capsule in places was thickened with fibrous plaques. At the convex curvature, there was a subcapsular thin walled cyst. On section the pulp was moist; light purple gray Malpighian bodies were prominent.

The liver weighed 680 gm., was moderately firm, and had a smooth surface, and thin capsule. On section it was light purple, brown markings were indistinct.

Gall Bladder: The wall was edematous. In the lumen a small amount of yellow bile was found.

The pancreas weighed 24 gm., was moderately firm, lobular, and light purple-gray.

Intestines: The mucosa was light yellowish gray. The mesenteric lymph nodes were large, up to 16 mm. in diameter, soft and light purple-gray.

The adrenals weighed 8 gm.; the cortex was pale yellow-gray.

Kidneys: The left kidney weighed 58 gm.; right, 55 gm. They were moderately firm, with smooth surface, light pale brown with distinct fetal markings; cortex 6 mm. thick, and distinct light purple-gray markings. The medulla was light purple gray; mucosa of renal pelvis, pale gray.

Pelvic Organs: Urinary bladder mucosa was light gray; prostate measured 22 by 15 by 4 mm.; testicles weighed 1 gm. and were pale pinkish gray.

The skull measured 16 by 12 cm. and averaged 2 mm. in thickness.

The brain weighed 1165 gm. Leptomeninges were separated by an increased amount of clear fluid and were slightly injected, the vessels at the base being thin walled. With formalin fixation, the white matter of the cerebral hemispheres appeared slightly injected, light purplish gray. The lateral ventricle was dilated, the ependyma smooth, and the cortex and basal ganglia were pale gray brown.

Neck: The lower half of the dorsal spine and upper half of the lumbar spine were markedly curved toward the left side. The greatest deviation from midline was 5½ cm. Spinal cord was moderately firm in the dorsal region.

MICROSCOPIC EXAMINATION

Ribs: The line of endochondral ossification was regular. The columns of cartilaginous cells were well developed, as were the primary and secondary spongiosa. The marrow spaces were filled by an active erythropoietic and granulopoietic tissue.

Peritracheal Lymph Nodes: The capillaries were congested and the sinusoids were dilated. In the cortex the intranodular cords predominated and were rich in histiocytes. The secondary nodules were small in the center, the reticular cells were swollen and proliferated. There was a moderate number of polymorphonuclear leucocytes.

Pancreas: The islands which were fairly numerous were well separated from the acini.

Spleen: The pulp was moderately congested, and the cords were composed of lymphoid cells, free histiocytes with occasional iron granules and polymorphonuclear leucocytes. The Malpighian bodies were large and their central portions were prominent. The latter consisted of swollen reticular cells and the numerous chromatin granules.

Thyroid consisted of medium-sized follicles which were filled by pale stained homogeneous oxyphilic colloid and were lined by cuboidal epithelium. The interlobular septa were slightly thickened.

Hypophysis: In the anterior lobe the oxyphilic cells predominated. Basophilic and principal cells were about equal in number. In the intermediary portion there were small empty follicles which were lined by a cuboidal epithelium.

Lungs: The alveoli of the right lower lobe contained a serous exudate with a varying admixture of cells. The alveolar walls were slightly thickened and engorged with blood. The respiratory bronchioles and alveolar ducts in many places were plugged with clots of fibrin and mononuclear cells, while the large bronchi showed a leucocytic exudate in their lumen. The intrapulmonary lymphocytic tissue was prominent, chiefly on account of swelling of the reticular cells.

Adrenals: The three layers of the cortex were well differentiated, and the lipoid content of the cortical cells was diminished. The medulla appeared normal.

Thymus: The lobules were separated by ample fibrillar connective tissue with groups of fat cells. The medullary portion predominated over the cortex and contained many Hassall's bodies.

Testicle: The epithelium of the seminiferous tubules showed no attempt at differentiation. The tubules were separated by ample connective tissue.

Myocardium: Muscle fibers appeared unchanged. There was slight edema of the interstitial tissue.

Spinal Cord: Sections taken through cervical, thoracic, and lumbar portions of the spinal cord revealed the leptomeninges to be free everywhere from cellular elements, except for the presence of elongated chromatophore cells. The ganglion cells in the gray substance were prominent and showed no pathologic changes. The white substance was normal everywhere.

POST-MORTEM EYE EXAMINATION

(By Dr. Georgianna Theobald)

Left eye (Fig. 5) measured 26 by 25 by 32 mm. On the nasal side the distance between the cornea and optic nerve was 29 mm. On the temporal it was 45 mm. There was an accessory inferior oblique muscle. Both grossly and microscopically, the eye presented the picture of axial myopia.

A congenital abnormality persisted at the angle of the anterior chamber where an adhesion between the iris and the corneoscleral trabeculae was due to an incomplete separation of one from the other. This was most marked on the nasal side where the trabeculae were poorly developed.

The iris was a rather solid structure, with no crypts, and several layers of variously shaped heavily pigmented cells formed its anterior surface. The sphincter pupillae was well developed and was 2 mm. wide. The dilator pupillae was not developed. This accounted for the fact that the pupil could not be dilated with mydriatics.

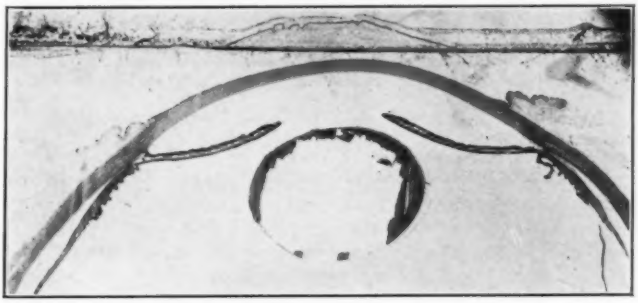

Fig. 5.—Section of eye.

The pars iridis retinae was interesting on account of the fact that the unpigmented layer of the ciliary body extended beneath the iris, over half its area, and ciliary processes extended from the peripheral surface of the iris.

In the ciliary body which was small, there was a scarcity of circular muscle fibers; the processes were few in number.

Posteriorly, the choroid was thinned, and was absent beneath the myopic crescent where the stratum pigmenti was also missing.

The retina showed the effect of great stretching, although in some places it was well preserved. The optic nerve appeared normal.

The lens was small and roundish; the suspensory ligament fibers were well formed; a few extended into the unpigmented epithelium of the iris as well as the ciliary body.

Diagnosis and Comment.—Axial congenital myopia, due to failure of separation of tissues in the angle of the anterior chamber. The sphincter pupillae began to separate from the pigment epithelium about the sixth month. The aberration of development occurred during the sixth month, as evidenced by well developed sphincter pupillae and the absence of the dilator pupillae.

SUMMARY AND CONCLUSIONS

A case of arachnodactyly occurring in a negro child is reported. An autopsy, including a histologic examination of the eye, was made in this case.

Examination of the eye revealed an absence of the dilator pupillae which accounts for the fact that the pupil cannot be dilated with mydriatics. The findings of the eye indicate that the aberration of development occurred during the sixth month of fetal life.

Laboratory and autopsy findings lend no support to the theories that either a disturbance of the endocrine glands or a primary muscle or bone disorder is the cause of this condition. From a review of the literature and from our case, it is felt that this condition is probably one which occurs in the early embryonic stage, and may be considered an example of defective anlage.

We wish to extend our thanks to Dr. Harry C. Gradle and Dr. Leo Mayer, of the Department of Ophthalmology, and Dr. Philip Lewin, of the Department of Orthopedics, for their valuable aid.

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American Academy of Pediatrics

Proceedings

NINTH ANNUAL MEETING OF THE AMERICAN ACADEMY OF PEDIATRICS

CINCINNATI, OHIO, Nov. 16-18, 1939

The annual business meeting of the American Academy of Pediatrics was called to order at 7 P.M. by the president, Dr. Henry Helmholz, in the Hall of Mirrors, Netherland Plaza, Cincinnati, Ohio, Nov. 16, 1939.

The president read his address.

Dr. Borden Veeder presented the report of the Nominating Committee, which made the following recommendations:

Vice-President (President-Elect)—Richard M. Smith, Boston, Mass.
Chairman of Region I—Stanley Nichols, Asbury Park, N. J.

A motion was made and carried that the recommendations of the Nominating Committee be accepted and officers considered elected as named.

The incoming president, Dr. Joseph B. Bilderback, was then inducted into office. Dr. Bilderback spoke a few words of appreciation of the honor bestowed upon him by the Academy.

The secretary read the names of the members who had died during the past year and the membership rose in commemoration of these men. Dr. Isaac A. Abt of Chicago read the following brief eulogy of Dr. Henry Dietrich:

Henry Dietrich (1876-1939)

After a protracted illness, Dr. Henry Dietrich died on Oct. 16, 1939, at the Children's Hospital in Los Angeles, which he helped to found, and where he had served as chief of the attending staff for many years.

He was born in Switzerland, April 15, 1876. He received his primary school education there and came to America when he was about twelve years old. He graduated from Rush Medical College in 1898 and served two years' internship at the Presbyterian Hospital in Chicago.

He first acted as physician to an Idaho mining camp and, after serving several years there, he was transferred to Morenci, Ariz., where he again acted as contract physician for a copper mining company. Here he came in contact with people of every rank of the social scale in many happy, as well as tragic, situations, and he learned the lesson of human relations and fellowship which undoubtedly shaped his attitudes throughout his career. All forms of medical and surgical activity gave him a broad outlook on life, both as a physician and as a man.

After about five years of very active general practice, he was granted a leave of absence and went to Berlin, Vienna, and Zurich to study pediatrics for a year. After this, he returned to the mining camp in Arizona and served another six years as physician and surgeon. At the end of this time he returned to Europe and con-

tinued his postgraduate studies. He started pediatric practice in California in 1913 and was one of the first to specialize in this branch in Southern California.

Dr. Dietrich was an excellent clinician, painstaking, conscientious, and reflective. He was a splendid diagnostician. He had a philosophy of life that was based on common sense, integrity, and truth, and he showed these high qualities in his relations toward his patients, colleagues, and medical organizations, as well as to his community and to his country.

He was never flippant, but always serious while at work, though he understood how to relax, and then he could show a keen and refreshing sense of humor. It was characteristic of him that he appreciated the loyalty of his friends and returned their friendship with warmth and affection.

HENRY DIETRICH

He was a member of the American Pediatric Society and one of the founders of the American Academy of Pediatrics, serving the latter organization as president in 1935-1936. He wrote several articles on tuberculosis, breast feeding, undulant fever, and heliotherapy, although his influence on California medicine was more the result of his example and teaching than of his writing. He was clinical professor of pediatrics at the University of Southern California.

True to his Swiss ancestry, he loved the outdoors—the mountains, the desert, and all of nature's grandeur. His hobbies were camping, fishing, photography,

and travel, and these took him through practically all of the mountains of the West. For years he and his family spent their annual holidays in the high Sierras of Southern California. During his last three years he and Mrs. Dietrich made extensive trips to Mexico, Central America, and the South Sea Islands, visiting untraveled regions where he communed with the majestic scenery, as well as with primitive man.

Shortly before his last illness, he made a prolonged visit to Moorea near Tahiti. In describing this region, he wrote in a personal letter, "There is beauty everywhere, and it must not only be seen but sensed to appreciate it." Continuing, he says, "Nature has been most lavish here. Bizarre mountain peaks, waterfalls, streams cool and clear, an abundance of tropical vegetation and an agreeable climate make this place an abode of delight." He goes on to describe the simple life and characteristics of the natives. One must have known Dietrich to appreciate how this life of outward simplicity appealed to the inner splendor of his soul. We may say with Emerson:

> He who knows what sweets and virtues are in the ground, the waters, the plants, the heavens, and how to come at these enchantments, is the rich and royal man.

It was suggested that a copy of this obituary be sent to the family of Dr. Dietrich.

The Report of the Executive Board was taken up in detail and accepted.

Reports of Meetings of the Executive Board

The meeting of the Executive Board of the American Academy of Pediatrics was held at the Orrington Hotel, Evanston, Ill., June 17, 1939.

Reports were received from the various regions and committees, and Mr. Lawrence H. Selz presented his report on publicity.

The Committee on Honorary Members has agreed that there should be created a group of honorary members and suggests that this class of membership be restricted to pediatricians. Dr. E. Gorter, of Holland, is at present the only pediatrician who is an associate member. The Committee suggests that he be transferred to honorary membership and that at the time of the next International Congress several more prominent pediatricians from foreign countries be elected to honorary membership.

The Committee suggests that the list of associate members otherwise be not changed, except that it be added to from time to time, as they feel that a relatively large associate membership composed of men who are prominent in fields ancillary or interlocking with pediatrics is a distinct asset to the Academy.

JOSEPH B. BILDERBACK, Vice-president.

The meeting of the Executive Board of the American Academy of Pediatrics was called to order by the President, Dr. Henry F. Helmholz, at 10 A.M., at the Netherland Plaza, Cincinnati, Ohio, on Wednesday, Nov. 15, 1939.

Those present were:

President, Dr. Henry F. Helmholz
Secretary-Treasurer, Dr. Clifford G. Grulee
Chairmen, Region I—Dr. Stanley Nichols
II—Dr. E. C. Mitchell
III—Dr. A. Graeme Mitchell
IV—Dr. Edward B. Shaw

Associate Chairmen, Region I—Dr. Lewis Webb Hill
II—Dr. Hugh Leslie Moore
III—Dr. Edgar E. Martmer
IV—Dr. Hugh Berkley

The following applications for membership were accepted:

Region I

Bernard Benjamin, Brooklyn, N. Y.
Reuel Allen Benson, New York, N. Y.
H. Arthur Berson, Boston, Mass.
Burtis B. Breese, Rochester, N. Y.
William W. Briant, Jr., Pittsburgh, Pa.
Arthur J. Cramer, Jr., Kenmore, N. Y.
William H. Gavsie, Montreal, Que., Canada
Albert Scott Harden, Jr., Maplewood, N. J.
Henry W. Kaessler, Bronxville, N. Y.
Aims Chamberlain McGuinness, Philadelphia, Pa.
Arthur C. Swartz, Albany, N. Y.

Region II

Jack Chesney, Knoxville, Tenn.
Guy L. Hacker, Dallas, Texas
John Keller Mack, Louisville, Ky.

Region III

Samuel S. Bernstein, Detroit, Mich.
Park S. Bradshaw, Muskegon, Mich.
Ernest L. Glascock, Kansas City, Mo.
C. Jack Harrison, Chicago, Ill.
Herman M. Jahr, Omaha, Neb.
Reuben I. Klein, Chicago, Ill.
John L. Law, Ann Arbor, Mich.
Bernard A. Mazur, Fargo, N. D.
J. Harry Murphy, Omaha, Neb.
John A. Schoonover, Denver, Colo.
Harry A. Towsley, Ann Arbor, Mich.
Maurice B. Weiner, Detroit, Mich.
Robert E. Williams, Chicago, Ill.
James L. Wilson, Detroit, Mich.

The following resignations were accepted:

Ralph Bowen, Houston, Texas
William B. McIlwaine, Petersburg, Va.

The applications of Dr. Ada E. Schweitzer, Indianapolis, Ind., and Dr. Ellen A. Stone, Providence, R. I., for Emeritus Fellowship, were accepted.

Memphis, Tenn., is recommended for the tenth annual meeting.

In discussing what should be done with the sum of money collected by assessment for the International Congress, the Executive Board made the following suggestion: That the money be held intact until the next annual meeting for further decision based upon action of the International Congress.

The Report from the Council for Pediatric Research was accepted, and by action of the Executive Board this Council is to be allowed to draw upon the Society's funds up to $250 for traveling expenses up to July 1, 1940.

It was decided that the President should appoint an historian whose duties would be outlined in detail.

It was decided that the following committees should be appointed:

1. A committee to prepare a pamphlet on vitamins comparable to the one on immunization procedures.
2. A committee on child health to cooperate with the American Legion.
3. A committee to recommend distinguished men for honorary membership.
4. A committee to interest itself in the procuring of fellowships in the United States for promising pediatricians of Central and South America.

It was decided that a member of the Academy should be appointed to help revise the sections concerning infants and children in *A Manual of Suggestions for Conduct of Periodic Examinations of Apparently Healthy Persons.*

The report of the Committee on Legislation was accepted, and the following resolution adopted:

BE IT RESOLVED: (1) That the American Academy of Pediatrics approve in principle the objectives of the National Health Act as it relates to children, but recommend that the Senate Committee on Education and Labor give further detailed study to its provisions, with the counsel and advice of practicing physicians and professional organizations who together will form the instrumentalities through which the success or failure of the Act will be determined.

(2) That the American Academy of Pediatrics, regarding the provisions for maternal and child welfare, and the care of sick children, definitely favor the use of public funds to provide such services to those groups of the population unable to pay for medical services, to the end that the standards of medical care may be maintained at a high level, among such groups.

The motion was made and carried that the change in the By-Laws regarding Honorary Fellows, be accepted.

The reports of the various committees as submitted in mimeographed form, were accepted.*

The Report of the Committee on Revision of the Pharmacopoeia was accepted as read.

At the close of the scientific session on Friday afternoon, the report of the Committee on Medical and Hospital Insurance was presented and accepted.

Presentation of E. Mead Johnson Awards
By Borden S. Veeder, M.D.

At the annual meeting of the American Academy of Pediatrics last year, the Academy accepted the offer of the Mead Johnson Company to establish two E. Mead Johnson Awards for research work in the field of pediatrics. The terms of these awards are known to most of you. The recipient must be a graduate of less than fifteen years, and the object of the award is to encourage research among the younger workers. The entire field of pediatrics is included in the scope. The award is to be given each year at the annual meeting of the Academy for work published during the previous calendar year. The Executive Board has appointed a Committee on Awards, and it gives me great pleasure, as chairman of this Committee, to announce the first recipients of the E. Mead Johnson Awards: Dr. Frederick H. Gibbs of Boston and Dr. Dorothy Andersen of New York. The award to Dr. Gibbs is based upon his outstanding work in the field of epilepsy, based on electroencephalographic studies of convulsive seizures. It is to be hoped that from this work we will learn something of the nature of epilepsy that will offer some help in the relief of this condition. Dr. Gibbs is not a pediatrist; he is a combination of a physiologist and a neurologist and his work, which may not be familiar to all of you as it has been published in the neurological journals, was done in the neurological unit of Harvard Medical School connected with the Boston City Hospital.

The award to Dr. Andersen was on her painstaking study of chronic fibrosis of the pancreas and its relation to celiac disease, which appeared a year ago in the *American Journal of Diseases of Children.*

*These committee reports immediately follow the regional reports.

In addition to the monetary award, the Committee has prepared a certificate of award which we hope the recipients will, in the future, look back upon as a token of the recognition of their work. It gives me great pleasure to announce these awards.

Report of the Secretary

Deaths:

Dr. Henry Dietrich, Los Angeles, California, Ex-President
Dr. John C. Baldwin, Baltimore, Md.
Dr. Howard B. Hamilton, Omaha, Neb.
Dr. Oliver W. Hill, Knoxville, Tenn.
Dr. Helmina Jeidell, Denver, Colo.
Dr. Alexander Crump Kirby, Little Rock, Ark.
Dr. Harold O. Lund, Middletown, Ohio

Emeritus Fellow:

Dr. Harry C. Berger, Kansas City, Mo.

Associate Fellow:

Dr. William H. Park, New York, N. Y.

The American Academy of Pediatrics has passed through its period of organization and for the past year has been getting set for the major offensive. There has, in some places, been more or less impatience because we have not gone fast enough, but in order to make true progress one must be sure of his ground as he advances. I feel that the Academy has very definitely reached the point where it can go into the field and exert a great deal of influence. I find that the members exaggerate the influence of a central body and expect the central organization of the Academy to do what must largely be done in the states. We must remember that this United States consists of forty-eight separate commonwealths each one of which is quite jealous of its prerogative and, as a consequence, pressure which is exerted from a central agency is resented.

The special national committees are working hard to perfect the suggestions to which their efforts are directed and to guide the work of the state committees, but this is all that can be done. They cannot go into each and every state and do the work themselves. Each state must be a unit unto itself and must develop its own program. It may be sure that, as long as it develops this program along the lines laid down by the central committees, the program will be supported by these committees to the full. Every state offers a different problem and, therefore, must be taken care of by its own group. The two things which have marked the last few months have been the development of the work of the special committees and the development of our publicity program. In the Secretary's opinion, but have been very satisfactory. The publicity program has resulted in 793 clippings and has only just started. This has come just at the right time, when we are about to launch our work in various lines of endeavor.

A few weeks ago when the Secretary learned at the meeting in Washington that there was to be attached to the Crippled Children's Program a program for the care of children who are cardiac cripples, he wrote the state chairmen with respect to the administration of the crippled children's program in the various states. He has had a reply from 37 states and the territory of Hawaii. In only 13 of these 37 states was the program satisfactory as far as the pediatrician is concerned. In 21 it was definitely unsatisfactory, and in 3 it was questionable. In two or three of the states the conditions were abominable.

It seems to me that the crippled children's program has developed in a manner which is most unsatisfactory from the standpoint of the child. Every child who has a physical crippling should have a thorough physical examination and a psychical evaluation before he is submitted to orthopedic care. The orthopedist is eminently capable of looking after the limp, but he is far from

capable of looking after the child. The development of the program with the orthopedist doing the primary examination with the pediatrician called in only later is a mistake. No one knows this situation better than your secretary. He has fought in the meetings in Washington to try to get this program put over in the proper way, but the orthopedic surgeons have always objected to any interference on the part of the pediatrician.

Now some of you will say that this is up to the Children's Bureau. It distinctly is not up to the Children's Bureau. It is a local situation. The development of the program in your state is the affair of the people within your state and must be tackled locally. Many of us are doing all we can to meet the situation nationally, but the Children's Bureau, as already mentioned, cannot exert too great influence on the local plans. We would not have it otherwise, but, if we are to get the proper kind of care for these crippled children, we must interfere in the state programs and keep interfering until the local situation is improved. We must make the public know that the child must be taken care of as well as the leg.

The amount of work in the central office has increased materially with the growth of the Society, but I think the increase has been greater during the past few months with the appearance of various pamphlets. We are continually busy sending these out here, there, and everywhere. It is interesting to note that since the first of the year we have sent out practically 80,000 pamphlets of "For the Sake of the Children," 100,000 of "The Health Supervision Your Child Should Have," and at least 10,000 pamphlets of "Immunization Procedures." We have now available the pamphlet, "Pertinent Facts on Contact Infection of Children."

It should be mentioned that now, in conjunction with Mead Johnson & Company, the Academy is in the process of sponsoring a film for physical examination of the child; we hope it will be out in the not distant future. This is being done at the suggestion of the Parent-Teachers' Association and will be used in conjunction with their round-up and also, we hope, for many other purposes.

Respectfully submitted,

CLIFFORD G. GRULEE, Secretary.

Report of Region I

We are glad to report that, during one of the most difficult years which the medical profession in the United States has ever had to face, the state and province fellowships of Region I of the American Academy of Pediatrics have pressed steadily forward toward the development of many phases of the aims and objectives of the Academy.

Many groups in countries all over the world and to some extent in the United States are reverting to the time-dishonored methods of impatience, pressures, compulsions, and force as means for bringing about progress for the human race, peace, and an approach to the millennium. The ageless lessons of history conclusively prove that patience, repeated conferences, inspiration, education, and consequent cooperation are the only permanent means for oiling the wheels of social progress.

Let us hope in the year to come that all groups use these latter time-tried methods in all efforts toward our Academy's objective of the continual improvement of Child Health in America.

In these days of an insufficiency of conferences for the promotion of clear thinking, it is with great pleasure that I am able to state that the detailed reports here presented for inspection show conclusively that, in addition to the holding of two educational and inspiring regional meetings under the able leadership of State Chairman Beaven and the Rochester Fellows, and State Chairman Martin and the Southern New York Fellows, every state and province fellowship

has been busily engaged on many fronts in the promotion of the various phases of the Academy's objectives in conjunction with the various child health official and nonofficial groups in each state and province.

It is indeed inspiring in times like these, when it would be natural for our Fellows to be solely engaged in their individual care of children, to find so many of them willing to give so much time and thought to the general needs of child health in their various communities, states and provinces. We are proud to belong to a fellowship of medical men who are individually and collectively gradually adding work for the solution of the monumental problems to public child health to their individual private efforts to aid the health of children.

We have made sound progress in each fellowship toward our objective of being the "child health lobe" of the brain and the "child health eye" of the medical profession and governmental health and welfare departments, as well as functioning similarly for nonofficial agencies dealing with some phase of child health.

Great praise is due all of our state chairmen, their committees, and Fellows for the teamwork and hearty cooperation that has made this progress in Region I possible.

Our associate chairman, Dr. Lewis Webb Hill, together with other outstanding New England Fellows, has been developing the interest of New England physicians generally in the various phases of child health and the Academy's activities on behalf of Child Health programs. This is most cooperative and helpful, and Dr. Hill's work on behalf of the Academy is appreciated by all of us.

The highlights of the complete state reports follow:

Quebec.—By the steady addition of French-speaking Fellows, Province Chairman Goldbloom is laying the foundation (when the time is ripe) for expansion of Academy aims and activities in the Province of Quebec. The individual members are well integrated in the various Child Health activities of the Province.

Ontario.—A most important development on behalf of the pediatrician has occurred in the Province of Ontario, and Province Chairman Tisdall has been most active in the solution of the economic situation of the pediatrician in plans for health insurance. This, and another activity, are quoted for the interest of the Academy generally.

> As mentioned last year, we are now organized for economic reasons as a section of organized medicine here in Ontario, namely, the Ontario Medical Association, and the specialty of pediatrics is officially recognized as such by organized medicine. We feel that this is most important in view of the increased interest being shown in health insurance.
>
> The following activity, although not done officially by the American Academy of Pediatrics, may still be of interest to you, because of the fact that a considerable portion of the work was done by members of the Academy. During the past year, 40,000 colored posters illustrating in an attractive manner, "What to Eat to Be Healthy," have been distributed in the schools of Ontario. These posters were produced under the auspices of the Canadian Medical Association, the Ontario Department of Education and the Canadian Life Insurance Officers Association. They are being incorporated in the teaching curriculum of Ontario. It is hoped that these posters will stimulate the interest of the 8- to 15-year-old child in proper nutrition.

Dr. Tisdall and the Ontario Fellowship have made a very real contribution to the welfare of the pediatrician.

Maine.—State Chairman Foster and our small fellowship in Maine are carrying on an extensive program, as usual, for child health in Maine. Crippled children's clinics, preschool work, establishment of child health conferences financed by the Board of Health of Portland, and establishment of a children's heart clinic at the Children's Hospital, Portland, represent additions to an excellent Academy participation in this state.

New Hampshire.—Last year's extensive child health program by the Fellows of New Hampshire (Dr. F. N. Rogers, chairman) has been expanded by the formation of the New Hampshire Pediatric Society, whose function is to create interest in pediatric work throughout the state. Close cooperation is maintained with the child health and welfare departments in this state.

Vermont.—State Chairman Johnson and his Fellows are cooperating with the state department in an educational program on child health and the development of actual cooperation with local physicians in plans for better maternal and infant care. Professional courses have increased in number, which are carried on in cooperation with county medical and dental societies. Extra nutritional service has been made available, and our Fellows are ably assisting in this development.

Massachusetts.—In addition to the excellent program presented last year, State Chairman Sisson has laid special emphasis on developing Child Health interest in general practitioners, as well as increased interest in the supervision of summer camps and a plan for controlling contact infections. These activities are quoted from his report, as follows:

> The members of the Academy in Massachusetts have been endeavoring to foster a more acute interest in pediatrics among the general practitioners of the state, as it is felt that the responsibility for child welfare must be placed pretty directly in their hands. It has seemed best, therefore, to encourage meetings of the Academy members with the existing New England Pediatric Society. Two members of the Academy, Dr. R. Canon Eley and Dr. James Baty, are actively engaged in increasing the membership of this Society and plan to establish meetings and possibly teaching groups throughout the state.
>
> The Committee on Contact Infections has formulated no definite plan, but is actively engaged in studying existing conditions with the purpose of launching a constructive program throughout the state.
>
> There has been a great deal of interest in summer camp activities in Massachusetts. Dr. Lendon Snedeker, chairman of the state camp committee, is dividing the State into districts and will have subchairmen from these groups to assist him. The situation in metropolitan Boston has been very satisfactorily organized. Seventy-two camps have been carefully studied, and much has been done to improve the medical supervision of these organizations. It seems strange, but we have had in Massachusetts up to now no licensing of camps. This fall such a law has been passed which will give us at least a list of all camps and greatly facilitate the Committee's work in the future.

Rhode Island.—Dr. Henry E. Utter, chairman of Rhode Island, has extended the former widespread activities of the Rhode Island fellowship and developed the cooperation of the Academy with the school health medical heads in the state.

The Child Health Relations Committee of the Academy is meeting monthly with the Child Health Bureau of the state department of health to analyze state infant and child mortality to determine causes of mortality and remedies.

A study of premature deaths is being made, and suggestions as prompted by these studies, are offered to physicians and hospitals.

Connecticut.—As usual, the state fellowship of Connecticut has been exceedingly active on many child health fronts. New and special activities developed this year and are quoted as follows as presented by the state chairman, Dr. Oliver L. Stringfield:

> At the request of the program committee of the Fifteenth Clinical Congress of the Connecticut State Medical Society, the American Academy of Pediatrics prepared a program on neonatal pediatrics. This program was attended by over thirty physicians. Eight pediatricians and two obstetricians participated in the program. The success of this will, undoubtedly, make a pediatric program a permanent part of the Clinical Congress.
>
> Committees on contact infections, child health relations, cooperation with nonmedical groups and school health and school health education have been appointed and are cooperating with the national committees on these subjects. The committee on child health relations has been exceptionally active and as a result of its recommendations, Dr. Joseph I. Linde, former state chairman of the Academy and present president of the Connecticut State Medical Society, will utilize these recommendations as a presidential message to each of the county medical societies.
>
> The committee on school health and school health education has been cooperating with the general committee concerned with school health service problems of the state department of education.
>
> The crippled children's program, supervised by the state health department, is progressing satisfactorily with the cooperation of orthopedists, pediatricians, otolaryngologists, and other specialists when indicated. The pediatricians utilized for consultation service are those who are licentiates of the American Board of Pediatrics.

Northern New York State.—State Chairman Beaven is carrying on a splendid child health program and has divided his part of the state into districts centered around large cities, with consequent increased efficiency in the Academy's work. Quotations from his report follow, and especial attention is called to the study he has given to the lack of participation and utilization of pediatricians in public fields of child health work, and the necessity that the Academy give prompt attention to the study of this important situation which should be corrected.

> *Extension of Former Activities:* A questionnaire has been sent to each community in which there is one or more members of the Academy, asking for a complete outline of the children's health work that is being done in that locality and the extent to which the pediatricians are participating in that work. This survey is not yet completed because all the reports are not yet in, but it is nearly so and will give a very adequate picture of what is going on.
>
> Acquainting myself with the health situation as far as children are concerned in the state, e.g., (1) infant mortality rates in each of the counties, (2) pediatricians in each of the counties, (3) the amount of work contributed by pediatricians gratuitously, (4) the amount of work that is done in the state for which a fee is paid, (5) the number of pediatricians that are doing school examinations, etc.
>
> *New Activities This Year:* Establishment of four divisions within the state, each supervised by a subchairman: Buffalo, Arnold; Rochester, Bush; Syracuse, Silverman; Albany, Faust. Meetings held by each district for general practitioners in the rural districts were well attended and of great interest. Plan is to make them annual pediatric conferences of one day.

Conferences with Dr. Farmer of the Committee on Medical Education of the New York State Medical Society. Discussion of the Winslow Report. Participation of pediatricians in the educational work of the state.

Metropolitan New York State.—Dr. Alexander T. Martin and the metropolitan New York fellowship, in addition to holding a splendid regional meeting in June, have been busy developing Academy committees in their plans for the utilization of this large fellowship in the control of child health problems in New York City, as follows:

This report from Southern New York brings to the attention of the Academy a highly successful meeting of Region I on June 1, 2 and 3, 1939, in New York City, with a registration of 257 Fellows and 87 guests. Particularly noteworthy was the publicity in the press and on the radio which brought the Academy before the attention of the lay public. This publicity was handled expertly and with great discretion. No unfavorable criticism has been received.

On Jan. 17, 1939, a luncheon meeting was held to discuss the publicity of contact infections, school examinations and summer camps with editors of seven magazines and two members of the press. This meeting was highly productive.

On Jan. 25, 1939, a New York fellowship meeting was presided over by the regional chairman, Dr. Stanley Nichols. Twenty-six Fellows were present. The purpose of this meeting was to discuss in what ways the Academy fellowship could best function and how the Academy could be made most effective in New York City.

With the cooperation of the co-chairman, Dr. Beaven, state committees have been appointed on contact infections, child health relations, cooperation with nonmedical groups and societies, and school health and school health education. Two Fellows serve on each state committee, one from New York City and one from New York State. The chairmen of three of these central committees come from New York City or its environs, and it was not thought necessary to hold meetings of the corresponding state committees this year.

Our policy in New York City has been to work with and cooperate with the various well-organized child health agencies. The most effective work has been accomplished through the child welfare committee of the New York County Medical Society, which has as members many of the Fellows of the Academy. This committee has under consideration and study, contact infections, school health examinations, vaginitis as a public health problem, health hazards in children, tuberculin testing of children, the care of the premature infant, better records of the newborn in maternity hospitals, the care of the mental defective, the care of the hard-of-hearing and the care of cardiac children. These latter have been the concern and study of your state chairman, and efforts are being made to urge the state health department to include cardiac children in the class of crippled children, so that federal funds may be made available for their care.

New Jersey.—Under the able direction of State Chairman LeRoy A. Wilkes, the comprehensive development of the activities of the Academy is progressing well in close conjunction with the child health committee of the Medical Society of New Jersey and the Bureau of Maternal and Child Health of the state department of health and lay organizations interested in child health. The Fellows have also been very prominent in the Governor's Conference on Health and Welfare

which has been making a study during the past year of all phases of health in the state. Points of interest to our Academy fellowship are here quoted:

> The activities of the New Jersey Fellows of the American Academy of Pediatrics are inextricably interwoven with various Advisory Committees of the Public Health Committee of the Medical Society of New Jersey. This is necessarily so in a small state as well organized as New Jersey; it is also a desirable condition. It is fair to say that the Fellows of the American Academy of Pediatrics are taking an active part in the improvement of child health in all phases of the work being carried on in New Jersey. It is our intention, as indicated last year, to formulate our state program of child health activities in accordance with the general recommendations of the Governor's Conference on Health and Welfare in which our members played a prominent part during the study made. The final report of the Governor's conference has not yet been issued, but is expected shortly.
>
> No systematic survey has as yet been made of the medical supervision of camps. This has been placed on our program but cannot be carried out until next summer.
>
> Child health problems in the underprivileged group are well taken care of, and there are competent divisions of child hygiene in the state department of health and in the official and private institutions and agencies in New Jersey. These institutions and the Academy Fellows cooperate to the fullest extent in an organized way to provide necessary pediatric services to children in need thereof.
>
> One of the phases of child care which we believe can be most effectively provided by medical men is, in New Jersey, carried out by a definite plan under which the discovery of the case is done by a social agency and the eligibility for care by the physician is determined by the state agency who pays the physician an agreed upon fee for office and home calls, which fee still represents a contribution by the physician himself in the form of lowered fees. This applies only to wards of the State Board of Children's Guardians and indirectly to the children of mothers who receive a state pension. The plan is sound and will probably be further expanded to insure the high quality of medical services without too great an increase in the tax rate, made possible through the contribution of the physician who accepts the agreed upon lowered rate for his services.

Delaware.—State Chairman Margaret I. Handy's report as follows shows that she is utilizing the small Fellowship in Delaware to good advantage along the lines of the Academy's objectives:

> The members of the Academy have been very active this year in their cooperation with the Child Welfare work of the State Board of Health.
>
> (1) We had an antiquated system here of reporting and isolating contagious disease cases which the pediatricians have finally persuaded the health authorities to revamp.
>
> (2) We have been able to put across a fine tuberculosis program in the schools. All of the large consolidated schools have now been visited by our tuberculosis staff: each child (after written permission was obtained from the parents) was given an intradermal t.b.c. test and the positive reactors were brought by him to the state sanitarium and x-rayed. Complete reports were sent in any case to the family physician for follow-up work and disposition of the case. This scheme has been most satisfactory. We are hoping to get into the parochial schools next.

(3) We have made a complete survey of the state to determine the number of crippled children and to sort out the ones the Nemours Foundation will take care of and endeavor to get help for the others.

(4) One of our members is very active in school health work, and all of our members have been doing very active work with the preschool health examinations.

(5) There has been very little supervision of camps, and I hope we can work along this line next year.

(6) We have the cooperation now of two of our hospitals in doing Wassermann tests and vaginal smears free for any nursemaids or servants we send in. We are having an excellent response from the parents who are eager to have their domestics examined.

Maryland.—Our Maryland fellowship, under Dr. Fred B. Smith's leadership, works very closely with state and local departments of health in the development of the child health needs of the state. Extracts from the report which are of interest, follow:

Four Academy members were appointed to the Committee on Maternal and Child Welfare. There is one pediatric consultant for the counties throughout the state as well as one consultant for prenatal clinics throughout the state. An effort has been made to combine clinics which would offer both prenatal and pediatric consultations at the same time, thus lessening the number of visits necessary by the patient.

Three counties in the state have nurses to help with the obstetric needs of the indigent. In two of these counties there are nurse midwives. In the other counties the nurses are instructed in obstetrics to help with delivery, to prepare the patient, give anesthetics if necessary, and to be what other help they may be to the doctor. This has been very gratefully received by the practitioner and has helped to reduce infant mortality.

Recently there has been some effort to make a study of the dietary needs of the pregnant woman. There are 90 nurses in the 23 counties of the state, supervised by one instructor and, in counties where there are six or more nurses, a head nurse is appointed.

Crippled children are taken care of by nurses who give massage and manipulation. If crippled children who are seen in the clinic need operations, they are referred to one of two hospitals where complete examination is made, there being three pediatricians on service to examine these children, in addition to the other specialists, such as otolaryngologists, to give whatever attention the child may need. In all events those hospitalized are given a thorough examination.

The new blanks put out by the Children's Bureau are being used for a survey in order to lessen maternal and infant mortality. In case of an obstetric death the blank is sent to the attending physician to be filled out. In case this is not attended to, the matter is turned over to the local health officer. These reports are later studied by the committee, and every effort is made to better conditions.

Talks throughout the state are made from time to time on subjects of interest, and frequent radio programs are also given on subjects of pediatric interest. Consultations are provided for, both prenatal and throughout childhood.

Pennsylvania.—State Co-Chairman McCluskey and our newly appointed State Co-Chairman Lyon have been busy rebuilding the Academy's program in Pennsylvania, after a period of years during which the state department of health had been in a demoralized condition (as far as child health was concerned). Sound ground-

work was laid for renewed child health state developments at a meeting held in Pittsburgh on Oct. 4, 1939, at which the state committee of the Academy of Pediatrics, the Committee on Pediatric Education of the Medical Society of the State of Pennsylvania, and Dr. Dodds, new chief of the Bureau of Maternal and Child Health of the State Department met and outlined plans for the continuance of former child health projects and for close cooperation between the Academy Fellowship and individuals and groups doing child health work in Pennsylvania.

Members of the new Academy committees were appointed and a state committee has been created which, with these new developments, will insure a splendid Academy program in Pennsylvania in the year to come.

Dr. Joseph Stokes, former chairman of the Academy for Pennsylvania, has been asked to serve as chairman of the advisory committee for child health in the state department of health. All of this will mean real child health progress for Pennsylvania.

Washington, D. C.—State Chairman Donnally and his active fellowship in Washington have been very busy planning a program for the April, 1940, regional meeting of the Academy.

In addition to this work, the Washington fellowship has carried on many cooperative child health activities in conjunction with many officials and groups in the city. School health, camp supervision, child health relations and other committees have been appointed and are active, and much postgraduate work in Child Health for the general practitioner has been made available, both in conjunction with the Medical Society of the District of Columbia and the medical departments of Georgetown University and George Washington University.

Conclusions

These state reports show many points of expansion of our Academy's objectives and suggest some weak areas where further development is necessary. This year's reports show a considerable increase in intrastate activities, as well as utilization of more Fellows in committee and other activities of the state Academy fellowships, which is all very desirable.

From these reports, three conclusions are drawn and presented for the consideration of the Academy:

1. The status of the pediatrician in the present development of various forms of health insurance should be carefully studied by the Academy, together with recommendations for national and state programs of action to be taken in the very near future. This is outstandingly important, particularly in view of impending developments in the medical care of children and public child health plans in this country.

2. Careful thought should be given as to how the Academy can better suggest the integration of the pediatrician (as well as the physicians interested in pediatrics) in public child health activities, such as hospital clinics, child health conferences, school health work, child mental hygiene groups (child guidance clinics), etc., in our states and provinces.

It appears that in many of these rapidly developing activities the quality of medical service is substandard, and this is largely due to (1) lack of suggestion of qualified medical men for such appointments and integration of those qualified into these positions and (2) lack of opposition to the political patronage method of selection of physicians not qualified to give such medical service to children.

3. It would be of advantage to the Academy to have every state chairman follow Dr. Beavan's splendid plan for informing himself and his Fellowship as to the health situation affecting children in each state by finding out

(1) Infant mortality rates in each of the counties
(2) Number of pediatricians in each of the counties
(3) Amount of work contributed by pediatricians gratuitously
(4) Amount of work done in the state for which a fee is paid
(5) The number of county societies that have child health committees
(6) The number of pediatricians who are doing school examinations, etc.

Acknowledgment is hereby made, on behalf of Region I, to the Children's Bureau and the United States Health Service and the state departments of health and welfare in the various states who have, through their officers and particularly the chiefs of the bureaus of maternal and child health, been very cooperative in working with the Academy state chairmen and Fellowship for the improvement of child health programs, both national and in each state.

Particularly appreciated is the cooperative attitude, in the development of all Child Health policies and plans, federal and state, of one of our Fellows in this Region, Dr. Martha Eliot, Assistant Chief and Medical Director of the Children's Bureau, and her medical staff, many of whom are Fellows. Cooperative child health programs in each state, between the Academy Fellows, medical profession, state public officials (particularly health departments) and lay agencies interested in child health are being greatly aided by the helpful assistance of Dr. Eliot and her staff.

The holding of more conferences in each state, with the Academy participating with these groups and the maintenance of cordial cooperative working relationship for the good of child health, cannot fail to forward one of the main objects of the Academy, which is to

"Foster and stimulate interest in pediatrics and correlate all aspects of pediatric work for the welfare of children which properly come within the scope of pediatrics."

Respectfully submitted,

STANLEY NICHOLS, Regional Chairman.

Report of Region II

Our last Regional Meeting was held Nov. 16, 1938, at the Skirvin Hotel, Oklahoma City, Okla., in connection with the Southern Medical Association. Present with us were our President, Dr. Henry Helmholz, and our Secretary, Dr. Clifford G. Grulee. The morning session was devoted to several short, clinical papers; the afternoon to two panel discussions. Both the morning program and the afternoon round tables were well attended, considering the fact that Oklahoma is located on the western border of the region. Quite a number of members were present from Texas and the midsouth, but very few from the eastern and southern coast states. The business meeting was held following the afternoon session.

The year previous in New Orleans it was voted that this region have its meetings separate from the Southern Medical Association because it was thought that both the Academy and the Section of the Southern Medical Association suffered by being held at the same time. As the national meeting had been changed to the fall months, it was decided at this time to hold our regional meeting some time in the spring and at a more central location. It was further voted that there be no regional meeting for the year 1939; that our next meeting be held in the spring of 1940 at a place to be determined later. Two locations were suggested: Miami, Fla., at the Biltmore Hotel, and Edgewater Park, Miss., at the Edgewater Gulf Hotel. All members of the region were circularized, and the vote largely favored the Edgewater Gulf Hotel. Thus the regional meeting in 1940 will be at the Edgewater Gulf Hotel, March 22 and 23. Dr. Robert A.

Strong, professor of pediatrics at Tulane University, was designated as chairman of the committee to determine the type and personnel of the program. The type of program determined upon has been a number of short, clinical presentations by men selected from throughout the region. There will be four round tables and perhaps one or two panel discussions. The exact program has not yet been formulated. We hope to be able to defray all expenses of the regional meeting this year by commercial exhibits.

It has further been decided, if possible, to have the proceedings of all the scientific papers, including the round tables with the discussions, edited and mimeographed so that each member attending may be given a copy without cost. As this meeting is open to all reputable physicians in this region who are interested in pediatrics, all nonmembers will be given a copy, but there will be a charge to be determined later for this service.

As you know, the Academy now has a central publicity committee which covers not only the national, but the regional, state, and local meetings of the Academy. This Publicity Committee will begin to function in our region as soon as it finishes with the national meeting in Cincinnati to let the people of the South know what the American Academy of Pediatrics is as an organization, who compose it, and the type of work it stands for.

Since the last meeting Dr. James Bruce of Louisville, Ky., has resigned as associate chairman, and Dr. H. Leslie Moore of Dallas, Texas, has been appointed. Dr. Carroll Pounders has replaced Dr. Clark H. Hall, who resigned as state chairman when he was appointed professor of pediatrics of the University of Oklahoma. Dr. W. L. Funkhouser has replaced Dr. M. Hines Roberts as state chairman of Georgia, as Dr. Roberts felt that he could no longer carry the burden with his other work.

Dr. Arthur G. Jacobs, Memphis, Tenn., was appointed co-chairman in Tennessee because of the fact that the men in the eastern part of the state were so isolated from the western part that two chairmen were requested. Dr. Boyd Reading was appointed co-chairman in Texas for the same reason.

At the meeting of the Executive Board in Evanston, the following men were admitted as members of the Academy:

Dr. Ben Andres, Longview, Texas
Dr. Francis Garbade, Galveston, Texas
Dr. Stanley G. Wolfe, Shreveport, La.

Four applicants are to be voted upon by the Executive Board in Cincinnati in November.

A detailed report is rendered at this time in which all of the states except two are represented, because the regional meeting was omitted for one year and the chairman felt the members would be interested to know the activities of each state.

As chairman, I wish to thank you for your cooperation and assure you that I am always ready and willing to serve you and the Academy in every way possible.

Respectfully submitted,

EDWARD CLAY MITCHELL, Regional Chairman.

Alabama.—State chairman, Dr. Clifford L. Lamar, Birmingham. Number of members, 16. Report received too late for publication.

Arkansas.—State chairman, Dr. Edwin C. McMullen, Pine Bluff. Number of members, 6.

I doubt very seriously whether or not the Academy of Pediatrics per se has made any advance in Arkansas during the last year.

We were able to put a pediatrician, Dr. Joseph Brennemann, on the program of the state medical society meeting. He also talked to our state pediatric society and held a round table discussion at the lunch hour. Aside from this activity, I know of nothing that has been done by pediatricians as members of the Academy.

Health centers continue to spring up, beautiful buildings, built by the WPA in charge of health officers, assisted by secretaries, technicians, and visiting nurses. Shots are given to rich and poor, school age and younger, paid for, of course, by the government. Tonsillectomies are done on patients who are sent into the hospital following an examination by a visiting school nurse who knows nothing whatever about whether or not a tonsil should be removed. The orthopedists still continue to hold forth, drawing a minimum salary of $1,000 a year, operating on "children" 20 years of age and 6 feet tall. The pediatrician, for a while, was paid to make a preliminary examination of operative prospects, but recently that has been stopped. According to my personal knowledge the ratio of monies paid to orthopedists and pediatricians for services rendered the indigent crippled is as 1000 is to 57. The $57 represents what I was paid and $1,000 represents what was paid to my good friend and associate orthopedist last year.

Politics still hold forth, eligibility or qualifications have little or nothing to do with it. An administrator who poses as an orthopedist and who is no more one than I am refuses to pay me for my services and instructs me to tell him what I did, when, to whom and why, and then he will pay me as he sees fit. All the while, I hold a "card," deservedly or not, in the Academy of Pediatrics. As far as the American Academy of Pediatrics and its influence on this situation is concerned, it might just as well not have existed. I may be the guilty person, but I am willing to carry out the orders from the "higher ups." Issue such orders.

Florida.—State chairman, Dr. Warren W. Quillian, Coral Gables. Number of members, 20.

During the past year organized activity in Academy work has been accomplished largely through the efforts of the Florida Pediatric Society. This group meets on the day preceding the annual convention of the state medical association. Active membership consists largely of Academy members.

Section 5 (B), Article III of our Constitution and By-Laws states specifically that it shall be the duty of the state chairman "to promote association and cooperation between the Fellows in his district, to consider with them the problems arising there and initiate when necessary activities in furtherance of the Academy's aims and purposes." Accomplishment of the ideals and purposes for which the Academy was founded, with organized effort of the membership, has seemed an elusive problem. Up to this time, individual effort and cooperation with existing agencies for the promotion of child health and welfare has been attempted without any elaborate or fixed program in Florida. Members of the Academy have taken part in the initiation of tuberculosis surveys and have served on the faculty of seminars and short courses for the education of negro physicians and nurses in pediatric subjects. There has been a close bond of cooperation between the pediatric group and the leadership of the state board of health. Child welfare work sponsored by the Junior League and by the Southeastern Florida Children's Home Society at Jacksonville and at Miami is conducted with the voluntary medical supervision of Academy members in both cities.

Academy activities, then, have proceeded along with those of pre-existing organizations. We in Florida believe that for the next year emphasis should

be placed upon building up the morale and improving the spirit of fellowship among pediatricians instead of conducting pediatric clinics for the instruction of the profession at large. The Academy should be a force in helping the pediatrician himself. If our membership serves as an inspiration and represents a goal or achievement in our chosen specialty, it must have some practical application to our daily duties. For this purpose during the past two years, at the suggestion of our regional chairman, Dr. E. C. Mitchell, members of the Academy have gathered at Orlando for a one-day meeting without a program. Informal discussion in round table fashion includes medical economics as well as subjects of scientific interest. The chief value of this meeting (held this year on November 12), is the spirit of camaraderie and better fellowship engendered.

In addition to the regular program of the state pediatric society, the Academy has been requested to furnish two essayists for the annual program of the Florida Medical Association. Academy members are compiling data for a forthcoming group report designed to determine the incidence and course of certain infectious diseases of childhood in the state. Our attempt at appraisal of the facilities and accuracy of diagnoses at the State Institution for Feeble-Minded Children, which was previously reported, has not been accomplished on account of an absence of funds and lack of interest. As a geographical unit of the national group we feel that in our state the Academy is attaining a position in the lives of the individual membership that will make possible the fulfillment of the aims and purposes for which it was organized.

Georgia.—State chairman, Dr. W. L. Funkhouser, Atlanta. Number of members, 17.

The following are the essential activities of the Academy in Georgia:

As state chairman, I appointed committees on child health relations, contact infection, cooperation with nonmedical groups and societies—camping, Parent-Teachers' Association, school health and school health education, medical education, and mental hygiene.

The Committee on Child Health Relations has been quite active, especially in carrying out the program of the national committee. They had the president of the Medical Association of Georgia appoint a child health committee for the state association, from the Academy, to act in an advisory capacity to the state medical society. They have also requested that the chairman of the national Committee on Child Health Relations request the president of the American Academy to have the state health commissioner appoint a similar committee to work in a similar capacity to the state board of health.

The Committee on Contact Infection has received its program from the national chairman and is taking steps to follow his recommendations.

Since I have not yet received reports from the chairmen of the other committees, I do not know the extent of their activities, if any.

I have found the members most cooperative and anxious to assume any responsibility to develop the program of the Academy in their locality, as well as for the state at large. I think that the National Committees should proceed with their recommendations as soon as possible in order that these state committees can be something more than a name. I realize that it takes time to organize a practical program, but I do feel that the sooner these committees can become active the greater interest will be shown in the Academy.

Georgia has seventeen Academy members. There are six men certified by the American Board, making them eligible for membership. There are a number of young men in the state who are, or soon will be, eligible to take the American Board. We should develop enough interest in the Academy, not only to fulfill

our responsibility to the community, but also to protect the interests of pediatrics by increasing Academy activities to such a high degree that all eligibles would deem it a privilege to be a member of the Academy.

Kentucky.—State chairman, Dr. Philip F. Barbour, Louisville. Number of members, 10.

A meeting of the members of the American Academy of Pediatrics of the State of Kentucky was held in Louisville and a very fine outline of work for the coming year was planned. Our postgraduate work is being extended. In addition to the course held at the Children's Free Hospital each spring, teams are sent out in the state to hold clinics and child welfare conferences and to present talks on appropriate medical subjects. Through the aid of Dr. Thomas J. Marshall, the Southwestern Medical Society held a special pediatric meeting at Bardwell which members of the Academy conducted and which was considered a great success. Pediatric conferences have been held at the state association meetings for some years. They have grown in interest and attendance. These conferences are sponsored by the members of the Academy, but we utilize as far as possible any men in the state who are especially interested in pediatrics.

In cooperation with the Kentucky Department of Health, we have made it possible to send to each county health unit in the state a model of an incubator for premature infants and also a model box for the administration of oxygen to children needing it. The lives of several children have been saved already by the use of these in the more remote counties.

The children who are admitted to the various crippled children's hospitals are examined by orthopedists before admission. A committee has been appointed to stress the importance of a thorough examination before operation by a trained pediatrician. This is being done in Louisville, but at the other hospitals in the state we have not as yet a sufficient personnel from the Academy to do the job. This committee is to emphasize the importance of this procedure before the respective authorities.

We are investigating the possibility of dramatizing pediatric subjects over the radio in cooperation with the state board of health. They are putting on such sketches of general medical subjects.

At the suggestion of the chairman, letters were written to the state department of welfare and Dr. Wilson, who is in charge of the various hospitals for the insane and feebleminded, requesting that a pediatrician be appointed on the psychiatric committee, this meeting with the approval of the civil authorities. The chairman has written a letter, endorsed by the state department of health, to each philanthropic agency in the state having to do with the care of children, requesting that it appoint a physician as a member of the board of the institution, in order to secure expert advice on the children's health problems.

The high mortality rate among colored children in our state was commented on, and a special committee was appointed to make a study and efforts made to contact colored physicians in order to give them some special instructions in the care of babies.

In conjunction with the Louisville Tuberculosis Association a committee was established to plan for a check-up on the nurses, maids, and cooks in families throughout the state.

Active committees have been appointed to contact the general committees appointed by the Academy on contact infection, child health relations, cooperation with nonmedical groups and societies, and school health and school health education.

The Kentucky Department of Health appoints a special advisory committee to the Department of Maternal and Child Welfare, and there has been a very

fine understanding between the Academy and the department of health. We are now preparing a list of key men to be utilized in the state for the children's conferences now being organized by the Children's Bureau. Other projects have also been undertaken, but these are the major plans for the coming year.

Louisiana.—State chairman, Dr. Robert A. Strong, New Orleans. Number of members, 18. Report received too late for publication.

Mississippi.—State chairman, Dr. Harvey F. Garrison, Jackson. Number of members, 8: members who are licentiates of the American Board of Pediatrics, 6; members who are not licentiates, 2. Licentiates in state, who are not members of the Academy, none.

We have no new members for 1939. We have two members who are eligible for examination by the American Board of Pediatrics, and I feel that they will take the examination at the first opportunity. It will be noted that Mississippi has only ten physicians devoting their entire time to pediatrics. All of those who are doing so are members of the Mississippi State Pediatric Society and are active to every call for pediatric service. We have had several fine postgraduate courses in pediatrics given by Dr. Robert A. Strong, professor of pediatrics, Tulane University, and Dr. George M. Lyon, Huntington, W. Va. The lectures were well attended by the physicians in Mississippi.

Our state pediatric society has a large annual meeting on the afternoon and night before the annual meeting of the Mississippi State Medical Association. We usually have three or four outstanding authorities on pediatrics on the program at this time. We extend state-wide invitations to the medical profession to attend and participate in the discussions. These meetings have attracted state-wide attention and have been well attended.

The last annual meeting was held at Gulfport, at which time we had several outstanding pediatricians on the program, as well as quite a number of leading pediatricians from our border states of Louisiana, Alabama, and Florida, who participated in the discussions. The principal participants at this program were Dr. Edward Clay Mitchell, Memphis, Tenn.; Dr. William L. Funkhouser, Atlanta, Ga.; and Dr. William B. Wendell, Memphis, Tenn.

In addition to these annual meetings, we have several call meetings in which only the members of the Society participate.

Our members respond willingly to invitations to appear on programs of an educational nature, such as those sponsored by the Parent-Teachers' Association and health organizations. We conduct physical examinations for preschool children and act in an advisory capacity on matters pertaining to child welfare of the federal and state health groups. The members of the Mississippi State Pediatric Society contribute a large amount of their valuable time toward the care and treatment of the indigent children of this state. The service for newborn infants, which was authorized by the state pediatric society for the state maternity center, is operating very well.

We have, for many years, contributed largely of our services to the state junior auxiliary for the care and treatment of the indigent children in their service. We are cooperating with the Mississippi State Medical Association in fostering a plan for hospital facilities for the crippled children and children with contagious diseases and for the establishment of an isolation department to the present Mississippi State Charity Hospital in Jackson.

The Mississippi State Pediatric Society is cooperating to the fullest extent in the syphilis campaign and all other health activities which are being conducted by the federal group and state department of health. Mississippi is fortunate

in having a state board of health whose members are selected by the Mississippi State Medical Association. Hence it can be seen that their sympathies and cooperation with the state department of health are essentially one and the same.

A fine spirit of congeniality and cooperation exists among the members of our society and the members of the state medical association. Both societies are working harmoniously in and through every avenue to promote better health for the indigent children of the state.

North Carolina.—State chairman, Dr. Aldert S. Root, Raleigh. Number of members, 18.

The most constructive and far reaching pediatric measure undertaken in the state this past year was the North Carolina State-Wide Conference on "Better Care for Mothers and Babies." This conference, the first of its kind in the United States, was held in Raleigh, Feb. 15, 1939, under the auspices of the National Council for Mothers and Babies and the North Carolina Board of Health. The object of the conference was to gather as much information as possible on subjects pertaining to maternity and infancy care, and then to disseminate this information to different parts of the state, chiefly through local health departments. Morning, afternoon, and night sessions were held.

The first part of the morning session was devoted to a symposium of pediatric papers and the latter half to a symposium of obstetric papers. The essayists were among the leaders in the state in their two branches of medicine.

The afternoon program included dentistry, nursing service, the social service, the particular needs of the negro, nutrition, and the institution of health programs by individual initiative.

On the program of the night session were Gov. Clyde R. Hoey, Mrs. Elwood Street, Chairman of the National Council for Mothers and Babies, Dr. Martha M. Eliot, assistant chief of the U. S. Children's Bureau, Dr. Fred L. Adair, chairman, American Committee on Maternal Welfare, Dr. Bayard Carter, professor of obstetrics, Duke University, and Dr. George M. Cooper of the North Carolina Board of Health.

The success of the conference was proved by the fact that 500 men and women representing 77 of the 100 counties of the state were present in spite of inclement weather. Two hundred fifty of those present were connected with state, county, or city health departments, 150 were professional people not connected with health departments, and the other 100 were leaders in organized groups. The chairman of the American Academy of Pediatrics helped with the program and acted as chairman of the conference.

Plans are being made by the Advisory Committee to the Maternity and Child Health Services of the State Board of Health to carry out the second phase of the conference, i.e., to promulgate the information gained through other parts of North Carolina.

One or two other states are planning a state-wide conference patterned after the one held here last winter.

Several meetings of the Advisory Committee to the Maternity and Child Services of the state board of health have been held through the year. The most important function of the committee is to approve or suggest policies of the state board of health in relation to expenditure of funds available through the Social Security Act. Your chairman represents the American Academy of Pediatrics on this committee.

The accomplishments of the state board of health in its maternity and infancy program from April 1, 1938, to March 31, 1939, is shown by the statistics below:

Places		160	
Physicians participating		164	
Prenatal Service	*White*	*Colored*	*Indian*
New patients	1,427	8,350	147
Old patients	3,081	14,689	182
Wassermann tests	1,200	8,378	143
Reported positive	63	1,411	27
No. patients indicating presence of toxemic conditions	288	1,335	16
Delivery Service			
No. patients assisted in necessary medical attention through welfare or other agencies	361	944	1
No. patients found necessary to hospitalize for delivery	165	395	0
Infant Hygiene Service			
No. infants brought to center for inspection or medical examination	5,794	12,898	65

Oklahoma.—State chairman, Dr. Carroll M. Pounders, Oklahoma City. Number of members, 13.

I was notified of my appointment as state chairman the latter part of June, and there have been practically no activities since that time. However, under the chairmanship of Dr. Clark H. Hall, this state had the honor of entertaining the regional meeting last November in connection with the meeting of the Southern Medical Association. There was such splendid cooperation on the part of every one concerned that we all greatly enjoyed the occasion without feeling that it was at all burdensome.

Our State Pediatric Society held a very successful meeting in connection with that of the state medical association here last May with Dr. P. C. Jeans of Iowa City as the guest speaker.

It is gratifying to be able to report that 100 per cent of the pediatricians in Oklahoma City are members of the Academy and almost that proportion of those in Tulsa. There is much interest being shown in the regional meeting scheduled for next March, and I believe that Oklahoma will have a good representation there. We are already looking forward to the time when we might again have the privilege of entertaining Region II in this state.

South Carolina.—State chairman, Dr. William Weston, Jr., Columbia. Number of members, 10.

One meeting of the American Academy of Pediatrics was held in Spartanburg, April 11, 1939. Ten members attended. The discussion of the chairmen of the various committees was entered into. The instructions for the various chairmen to follow were indefinite at this time.

South Carolina has had an epidemic of acute anterior poliomyelitis this year beginning in April in Charleston where the infestation was heavy, but it spread over the entire state to a much less extent. After much persuasion and argument the Technical Advisory Committee of the Crippled Children's Division recommended to the Executive Committee of the State Board of Health which was approved, that the poliomyelitis cases be regarded as pediatric cases the first three weeks of the illness. This action was not taken until late in the epidemic, and the pediatricians did not benefit to the fullest extent by its approval. However, we believe it is a precedent which is well worth while marking and calling attention to in other states.

There has been some movement to increase the interest in the school children and the preschool children in traffic regulations. Dr. Davidson suggested the idea of writing articles for the newspapers on the most predominating disease; this has been followed out by the Columbia Medical Society and suggested to other societies. Of course, the name signed to the articles is that of the county medical societies, but they are prepared by the members of the American Academy of Pediatrics. Something must be done to induce more men to join the American Academy of Pediatrics. There has been practically no increase in this state for the past several years, though there are a number of young men who have begun the practice of pediatrics. My suggestion is that we in some way work in closer cooperation with the state board of health, where in all probability a part-time position may be found.

Tennessee.—State chairman, Dr. Horton Casparis, Nashville. Co-chairman, Dr. Arthur G. Jacobs, Memphis. Number of members, 27.

In making a report on the activities of the American Academy of Pediatrics for the past year in Tennessee, I suppose anything I might say will seem rather insignificant, for the reason that to me it has seemed wise for us to continue the policy of working through existing organizations and groups with their facilities and opportunities in our attempt to promote the health of children. Under these circumstances, the Academy receives no outstanding identification in its activities, but I feel that our efforts can be more effective in this state if we pursue that policy.

Dr. Arthur G. Jacobs of Memphis was appointed co-chairman of Tennessee during the past year, and in cooperation with Dr. Gilbert Levy, chairman of the Tennessee Subcommittee on Contact Infections, is discussing ways and means of getting more active work done concerning the matter of contact infections. Also cooperation with the executive secretary of the Tennessee Tuberculosis Association is being worked out in connection with this matter.

The Committee on Child Welfare of the Tennessee State Medical Association is composed of members of the Academy and is cooperating closely with the educational program of pediatrics in Tennessee. A course in pediatrics for general practitioners extending throughout the state over a period of two years was begun early this year. While this is not an Academy activity, members of the Academy in Tennessee, of course, approve of this program and cooperate closely with its promotion. Also the director of maternal and child health of the state health department, who is an Academy member, uses the same Committee on Child Welfare as an advisory group.

One of the Academy members of Tennessee has been given an opportunity to play an influential part in helping the American Legion formulate its interest and active program looking toward the promotion of child health in the various states of the United States. Still further, members of the Academy have taken an active part in postgraduate education of nurses, practicing physicians and health officers, whose responsibilities are such that during a large part of their time they are actively engaged in the promotion of child health. Academy members also have used every opportunity to cooperate with and influence parent-teacher groups and other lay groups in their work looking toward the promotion of child health.

The above gives a sample of the activities of the Academy members in Tennessee, and it has been our feeling that, even though these methods are not at all dramatic, they seem to be our most effective approach looking toward the accomplishment of our purpose, namely, the promotion of child health.

Texas.—State chairman, Dr. Edwin G. Schwarz, Fort Worth. Co-chairman, Dr. Boyd Reading, Galveston. Number of members, 45.

The chief activities of the Academy in Texas during the past year were as follows: (1) appointment of state committees to cooperate with similar national committees of the Academy; (2) participation in refresher courses; (3) cooperation with state health department and other medical and lay organizations in matters pertaining to child health.

The following state committees have been appointed:

1. Committee on Contact Infections—chairman, Dr. John G. Young; Dr. Max Woodward.
2. Committee on Child Health Relations—chairman, Dr. H. L. Moore; Dr. Sidney Kaliski; Dr. Frank Lancaster.
3. Committee on Cooperation with Nonmedical Groups and Societies—chairman, Dr. T. J. McElhenney; Dr. John G. Young; Dr. John Nunn; Dr. Byron York.
4. Committee on School Health and School Health Education—chairman, Dr. T. A. Tumbleson; Dr. George Cornick; Dr. Gordon McFarland.

The chairmen of these committees were selected with great care and with full knowledge of their interest and ability as manifested by accomplishments in their respective fields of interest. They in turn selected the other members of their committee. It is expected that through the efforts of these state committees much will be accomplished. The state chairmen of the Academy are deeply grateful to members of these committees for their willingness to serve. Already notable progress has been made.

Refresher Courses.—The same general plan as formerly employed has been followed during the past year. Obstetricians and pediatrists, residing in the state, give one- and two-day courses designed for general practitioners. Various localities in the state are selected by the councillors in the various districts. The courses are given upon invitation by members of the district. It is believed that these courses are not entirely satisfactory. The attendance has not been sufficiently large to justify the effort, and the doctors who attend, in many instances, are not the ones who could be most benefited. It is believed that a modification of the present plan must be adopted before these courses fulfill the mission for which they were intended.

An effort has been made to obtain a greater degree of cooperation from other medical organizations of the state especially the Texas Pediatric Society and the Texas Board of Health with reference to the adoption of a constructive state educational program and to ensure that matters pertaining to public health be presented to the public in a satisfactory manner. The Texas Pediatric Society has appointed a committee, of which Dr. E. G. Schwarz is chairman, to investigate this matter and to make suitable recommendations to the society at its next meeting in Fort Worth this fall. All members of this committee with the exception of one are members of the Academy. It is expected that a concrete program will be adopted. Great interest was manifest in the progress made by the national committee on contact infection. The consensus of opinion in the state was favorable. It was agreed, however, that the initiative in this regard should best come from a demand by the laity stimulated by an educational campaign under the supervision of the medical profession. In other words, the physicians must become familiar with the need before a program can be put into effect.

A closer relationship exists between pediatrists and members of the public health agencies in the state than at any previous time. It is the desire of the Academy of Texas at all times to collaborate with the state board of health in matters pertaining to child health.

At the last meeting of the Texas Pediatric Society held in San Antonio in May, 1939, a fund was created from which a yearly award is to be made for the most outstanding accomplishment in pediatrics during the year. The details of this award have not been worked out as yet, but it is believed that it will have a beneficial effect upon pediatric standards in the state and that eventually it may become much broader in its scope.

In 1938 the membership in the Texas Pediatric Society was 87. The membership of the Academy was 45. The Academy is not as popular in the state as the majority of its members desire it to be. This may in part be due to the failure of the state chairmen in the fulfillment of their duties and in part to a misunderstanding of the aims of the Academy.

This has been voiced on several occasions and apparently has its origin in what is considered a dictatorial attitude on the part of the governing body of the Academy. The members of this state feel that all officers, including state chairmen, should be elected by the membership.

Virginia.—State chairman, Dr. J. B. Stone, Richmond. Number of members, 21.

There are now 21 members of the Academy in Virginia. The activities of these members has consisted largely of their work in the Virginia Pediatric Society and on the Child Welfare Committee of the Medical Society of Virginia. During the past year 7 of the 9 members of this committee were members of the Academy. The committee has been especially interested in the work in the state with reference to tuberculosis, diphtheria, crippled children, the blind, the partially deaf, maternal and child health, and mental hygiene.

The mortality from tuberculosis for children under 15 years of age has dropped approximately twenty per cent in the past three years. The committee has given its support to a drive to secure more free beds for tuberculous children in the state sanatoria. Under the present rebuilding plan of the state health department, there will be provided about there hundred additional beds for tuberculous patients, and for the first time provision will be made for thirty beds for colored tuberculous children at one of the state sanatoria. Two mobile x-ray units are now in operation in the state, and two tuberculosis clinics are scheduled each week for adults and children. Prior to September, 1938, only one of these units had been in operation. It is estimated that by the end of 1939 at least 90 of the 100 counties in the state will have been covered by these units and 10,000 x-ray examinations will have been made by them.

In November, 1938, at the request of the state health commissioner, the committee met with representatives of the Virginia Department of Health to formulate plans for combating a recent increase in the incidence of diphtheria. As a result, an intensive state-wide campaign was instituted, leading to the known inoculation of 48,281 persons with toxoid. This was done through the cooperation of local health organizations, school officials, and private physicians. The number of deaths from diphtheria in Virginia has dropped from 238 in 1935 to 114 in 1938. Forty-seven counties are under health unit supervision, and it is believed that at least fifty per cent of the children in these counties have received preventive inoculations. It is estimated that seventy-eight per cent of the cases of diphtheria have occurred among those who had received no immunization. It is planned to bring the remaining counties of the state under health officer supervision as soon as funds are available for establishing health units.

The Virginia Departments of Health and Education working with state and federal funds have made much progress in the care of crippled children. The Crippled Children's Bureau has provided for the registration of every crippled child in the state, and more than 5,000 of the estimated 12,000 crippled children have already been registered. These are being treated at 35 clinics and 3

hospitals. So far these children have been cared for by the orthopedic surgeons without specific pediatric supervision. However, plans are in prospect for providing pediatric care for the orthopedic cripples and also for the cardiac cripples that might come within the jurisdiction of the Social Security Act. A member of the Academy, Dr. S. R. Newman, is on the Advisory Committee of the Crippled Children's Bureau. The education department has established a new division to expand its educational work by starting the schooling of crippled children at the age of 6 years.

Efforts for conservation of sight in indigent children continue to be handicapped by insufficient funds, but the child welfare committee is actively endeavoring to secure additional appropriations for the extention of the work of the Virginia Commission for the Blind.

A similar situation exists in regard to partially deaf indigent children. The committee is supporting the commissioner of education in his requests for adequate appropriations to provide special classes for those with impaired hearing as well as those mentally handicapped.

The Bureau of Maternal and Child Health has continued to extend its work during the past year. Clinics have been operated in 29 health districts having full-time health officers. These districts comprise 47 counties and 8 principal cities of the state. There are 28 established well-baby clinics, 59 prenatal—well-baby clinics and 86 prenatal—postnatal clinics. The organization and administrative work of these clinics is done by the health department, and the medical work is carried on by the local physicians. The state health commissioner is requesting of the legislature additional funds for the expansion of rural health activities and for maternal and child health service.

During the year revised copies of two booklets, "The Baby" and "The Child," were prepared by the Bureau of Maternal and Child Health for distribution to mothers. Members of the Academy aided in the revision of these booklets.

Members of the Academy have conferred with the director of the state board of public welfare and the director of the bureau of mental hygiene regarding the extension of the work of these agencies. The program sponsored by this department provides for a minimum outlay for a limited program along preventive lines. Provision is made for two full-time traveling clinics which deal not only with the feebleminded, but also with the general problem of nervous and mental disorders. Present facilities are totally inadequate, though the clinics conducted throughout the state have served the double purpose of helping a small group of individuals and of furnishing a demonstration of what might be accomplished if regular visits of the clinic could be provided.

The Medical Society of Virginia has acted favorably on the recommendations of its Child Welfare Committee: that an effort be made to have the department of health include in its budget a request for funds adequate to provide free diphtheria toxoid for use among the indigent of the state; that the Department of Public Welfare be supported in its request for adequate appropriations for carrying on its mental hygiene program; that an additional appropriation be sought for the use of the Commission for the Blind; for the extension of county health units and maternal and child health work; and for the Virginia Department of Education for its work among the physically and mentally handicapped, including those with impaired hearing.

By the end of February, 1939, nearly every section of the state had been covered by the postgraduate courses in pediatrics, conducted by the Department of clinical and Medical Education of the Medical Society of Virginia. Having completed the formal pediatric courses scheduled throughout the state, the clinician in pediatrics spent the months of December, January, and February

assisting in the diphtheria immunization program of the state department of health. During the years 1936, 1937, and 1938, 683 doctors had enrolled in the postgraduate courses in pediatrics with the total attendance of 1,933. With the exception of a few small areas the state was very fully covered by these courses.

During the year the usual fall and spring postgraduate clinics were held at the University of Virginia, and the Medical College of Virginia, respectively. Members of the Academy took part in these clinics and have also participated in a number of programs of county and district medical societies.

The Virginia Pediatric Society held its annual all-day clinical meeting in May; and its business meeting in October was followed by a round table, "Endocrinology in Childhood."

Academy committees on child health relations, mental hygiene, cooperation with nonmedical groups and societies, school health and school health education, medical education and contact infections have been appointed in line with the recommendation made at the general meeting of the Academy last year. However, there has been very little independent functioning of these committees, though their members have cooperated in the work of the Child Welfare Committees of the Medical Society of Virginia and the Virginia Pediatric Society. One member of the committee on child health relations is on the advisory committee of the Crippled Children's Bureau; and the committee on contact infections has been working on a program which it is hoped will ultimately have a state-wide effect.

West Virginia.—State chairman, Dr. J. Lewis Blanton, Fairmont. Number of members, 7.

During the past year, committees have been formed from the Academy membership with the following chairmen:

Russell C. Bond, committee on contact infections

Andrew E. Amick, committee on child health relations

Raymond M. Sloan, committee on cooperation with nonmedical groups and societies

George M. Lyon, committee on school health and school health education.

Do definite state-wide program has been instituted by any of these committees, but study is being made of the problems involved and trial plans have been set up in a few communities to determine their workability.

Postgraduate courses of similar type to those given in previous years were repeated in obstetrics and pediatrics this past summer. These courses, given under the joint auspices of the state health department and the state medical association, are held only in the rural and mining sections of the state. The attendance at each conference averages about 18. Many favorable reports come in from men attending these refresher courses, and unquestionably better obstetrics and pediatrics will result from the training these men receive.

A plan has been worked out with the state health department whereby birth certificates are delivered to the parents when an infant reaches the age of 6 months. At this time the parents are urged to have their infant immunized by the family doctor against diphtheria and smallpox before he reaches the age of 1 year. If this fails to elicit the cooperation of the parents, the child is required to present a certificate when he enters school showing that he has been immunized to these diseases before he is permitted to continue in the public schools of the state.

Our regional chairman, Dr. Edward C. Mitchell, addressed the West Virginia State Medical Association on the subject, "Sinus Disease in Children," and also participated in a panel discussion, "Diarrhea," before the section on pediatrics at the annual meeting in July. Both presentations were very practical and

well received. Dr. Mitchell also met with Academy members in attendance at the meeting and discussed various Academy and state problems.

There has been no change in our state membership during the past year.

Report of Region III

A meeting of the state chairmen of Region III was held in the Orrington Hotel, Evanston, Ill., on June 16, 1939. Present were:

William Wiley Jones, Colorado
George F. Munns, Illinois
Matthew Winters, Indiana
E. G. Padfield, Kansas
Wyman C. C. Cole, Michigan
Roger L. J. Kennedy, Minnesota
Hugh L. Dwyer and Park J. White, Missouri
Joseph A. Henske, Nebraska
Ralph E. Pray, North Dakota
Sterling H. Ashmun, Ohio
Goldie E. Zimmerman, South Dakota
Abraham B. Schwartz, Wisconsin
Edgar E. Martmer, associate regional chairman and
A. Graeme Mitchell, regional chairman
Clifford G. Grulee, secretary of the Academy

The minutes of the last meeting of state chairmen in Detroit were read and discussed, and also important points brought out by the Executive Board meeting in November.

The minutes of this state chairmen's meeting have already been published in THE JOURNAL OF PEDIATRICS.

Since the meeting of the state chairmen there has been correspondence between Dr. Mitchell and Dr. Martmer, and Dr. Dwyer relating to the regional meeting. Dr. Martmer is giving the benefit of his advice in regard to the details of such a meeting. It had been the opinion in the meeting of state chairmen that the region might set up some plan whereby a more coordinated effort could be brought about concerning the details of meetings. Much was learned in one city which would be of benefit to the local committee in another city. It was felt that Dr. Martmer would be very well qualified to give advice since the meeting in Detroit was unusually successful.

Respectfully submitted,

A. GRAEME MITCHELL, Regional Chairman.
EDGAR E. MARTMER, Associate Chairman.

Report of Region IV

Due to peculiarities in the distribution of the membership of this region, the problems of the Academy are somewhat different in Region IV from those in other parts of the country. Among the total membership of 130, 87 members live in California, 13 in Washington, 6 in Oregon, and 1 to 5 in each of the remaining six states, one territory, and two provinces. There are 30 physicians in the region, not members of the Academy, who have been certified by the American Board of Pediatrics, and who are thus potential members; all but a few of these men live in California. In areas in which there is good numerical representation of the Academy, there is excellent organization for the promotion of all aspects of child welfare and for the integration of Academy efforts with those of other interested agencies; but even in states in which there are only one or two members notable efforts have been made to promote Academy aims.

The annual regional meeting was held in Oakland, April 6, 7, and 8, 1939. An admirable program, arranged by Dr. Clifford Sweet, included a variety of scientific papers, panel discussions, and the presentation of subjects allied to

pediatrics. There was a large and enthusiastic attendance adequately representing the region; the president, president-elect, nad secretary of the Academy were in attendance. This annual meeting has become the major pediatric meeting of the Pacific Coast.

The following will summarize replies which were received from State Chairmen in response to a recent request for a report:

California.—Several members of the Academy serve on the advisory committee of the California State Bureau of Maternal and Child Welfare, including the chairmen for Northern and Southern California and the regional director; Dr. Ellen Stadtmuller is director of the bureau. At the present time, it is impossible for Academy members to conduct conferences and clinics in the more remote rural areas in which such work is contemplated, so that we have had to be content with an advisory capacity. A number of members have made trips in the past to conduct clinics, present refresher courses for practitioners, and address public health nursing groups.

Los Angeles County, San Francisco County, and several other California communities are attempting to set up measures for the examination of domestic help. One such experimental project in Beverly Hills is in active operation.

The nucleus for Academy activities in Northern California is the Association of Academy Members of the San Francisco Bay Region. It would be fair to say that the Southwest Pediatric Society serves a similar function in Southern California, although this maintains a separate organization.

Idaho.—In this state there are only two members. The Chairman, Dr. Harmon Tremaine has little to report save an honest effort to maintain a relation to all state-wide activities pertinent to pediatrics.

Montana has a single member, Dr. Harold C. Joesting, who last year reported the opening of the first pediatric ward in the state.

Nevada.—The membership of the region was saddened by the death, early this year, of Dr. William A. Shaw, state chairman. He has been succeeded by Dr. L. R. Brigman, who is carrying forward a vigorous campaign of pediatric activities, serving as the chairman of the Washoe County Citizens' Child Welfare Committee, member of the general board of the Nevada Tuberculosis League, member of the staff of the Nevada State Board of Health, advisory committee on maternal and child health and crippled children. Monthly clinics for well babies have been conducted, including those for Indians from Stewart, under supervision of the Nevada Maternal and Child Health Association. An effort has been made at public education through lectures before service clubs, churches, P. T. A., and nursery school meetings covering prenatal care, nutrition, immunization, tuberculosis in childhood, infant feeding, care of the healthy child, nursing the sick infant, etc. Much time and effort have been spent on new legislation covering the licensing of boarding homes, adoption laws, delinquency, and juvenile court procedures, etc.

New Mexico.—Dr. Meldrum K. Wylder reports that their membership of five is attempting to maintain relationship with the state department of health and the state department of maternal and child welfare so that the activities of the Academy in New Mexico are integrated with those of existing agencies.

Oregon.—Dr. James W. Rosenfeld reports that, although there has been little activity of the Academy members as a group, there has been a great improvement in the standards and scope of work relating to preschool health examination and the carrying out of recognized prophylactic measures, this improvement being due to better cooperation between physicians, the Department of Health and

the medical staff of the Visiting Nurses' Association. An effort is being made in Oregon to initiate a vigorous campaign for the routine examination of domestic help.

Utah.—There are three members in Utah, the chairman being Dr. Eugene H. Smith. Activity toward the fulfillment of Academy aims has been directed through the state board of health, especially the division of maternal and child welfare. The state chairman is chairman of the technical advisory committee of the department of health. It is planned to make a state-wide study of maternal and neonatal deaths as a cooperative effort of the state medical association and the state board of health.

Washington.—Dr. Herbert L. Moon has served as state chairman for Washington from the organization of the Academy until his recent resignation. Dr. Moon has served the Academy well and has been a conspicuously energetic state chairman with a serious view of the responsibilities of this position. Efforts have been made to establish medical supervision of the work with crippled children; there are two maternal and child welfare clinics in operation, and a third is soon to be established. One refresher course in obstetrics for sectional meetings of men in general practice has been completed and a similar course in pediatrics is contemplated in the immediate future. Dr. Moon's connection with the state board of health, state medical association and other interested agencies will continue to assure the integration of Academy activity with those of these other agencies. The newly appointed state chairman for Washington is Dr. Frank H. Douglass.

A number of suggestions have been received from state chairmen for the future guidance of the Academy. Among these suggestions are the following: that visiting speakers be made a feature of regional meetings and that the importance of panel discussion and symposia in the conduct of regional meetings be emphasized. The advisability of a more rapid rotation of men, especially younger men, through the positions of state chairman and regional chairman was a suggestion of one state chairman. Another proposal was that state chairmen in various groups of states should attempt, through conferences, to coordinate their program for their mutual benefit. It was further suggested that regional meetings could profitably devote a little time to the consideration of the economics of pediatric practices. Several members have inquired regarding the possible status of the pediatrician in war time with the suggestion that some study be directed to the questions involved. A more frivolous idea was advanced that a suitably selected entertainment committee might add to the gaity of both national and regional meetings.

Respectfully submitted,

EDWARD B. SHAW, Regional Chairman.

Report of the Committee on Child Health Relations

The modified child health relations program of this committee, approved by the Executive Board on June 17, 1939, has been approved by mail by the members of the Committee on Child Health Relations, with one minor change. It had already been approved by Dr. Martha Eliot, assistant chief and director of the Children's Bureau, and her staff, and we are now in a position, with this sound foundation, to make real progress in our state Academy fellowships toward carrying out the six points of the program which will aid greatly in the establishment of our State Fellowships in their proper position as the key child health group in each state.

Copies of this completed program have been sent to the State Chairmen of the Academy Committees on Child Health Relations, with the request that each State Chairman and his committee put into effect as much of this program as is feasible in his state. While the time for work has necessarily been short, since the programs have been sent out, we have already received (October 1, 1939) excellent progress reports from Kentucky, Georgia, State of Washington, Connecticut, Missouri, and Wisconsin. After reasonable time has been given for the development of the program in the forty-two states which now have committees, a progress report will be made, showing the highlights of action in each of the states.

In order to clarify further and discuss the program itself, the committee is holding a luncheon meeting at the Netherland Plaza Hotel, at Cincinnati, on Thursday, November 16, from 12 to 2 P.M., to which the state chairmen and their members have been invited. This meeting will afford an opportunity for questions and discussions, and, as far as time permits, reports by state chairmen.

From the reports already received, we have every reason to feel that the program is sound and will go steadily forward toward our desired objective of establishing each Academy fellowship as the key child health group in each state in the promotion of all desirable child health programs.

Respectfully submitted,

STANLEY NICHOLS, Chairman
PHILIP F. BARBOUR
W. L. CRAWFORD
MARTHA M. ELIOT
GEORGE M. LYON
OSCAR REISS.

Report of the Committee on Contact Infection

Your committee has been active in the promotion of measures to lessen the likelihood of infection of children with diseases acquired through contact with their adult associates. The attention of the public is being called to the need for securing periodic health examinations of those adults intimately associated with young children. The medical profession is being asked to make provision for adequate examinations, with lung x-rays, which will be easily accessible to all individuals.

Committees of Academy pediatricians have been organized in all but five states in the country. The national committee has kept in close contact with them in order to secure coordination and direction of effort.

Many state and national organizations have been contacted to obtain assistance in this campaign. The National Tuberculosis Association has been helpful in making it possible for us to reach the state tuberculosis associations. Their response and expression of willingness to cooperate have been gratifying.

Education departments of the schools in the states have been approached, asking their adoption of measures to insure freedom from tuberculosis among school teachers. Women's clubs, Parent-Teacher Associations, church organizations, and service clubs are also asked to enlist in this child health campaign.

A conference of colored Baptist ministers responded to a discussion of this subject by adopting a resolution endorsing the principle of medical examinations of domestic workers and other adults in homes with children.

The publicity in the press throughout the United States in June, which presented the attitude of the American Academy of Pediatrics toward health of adults associated with children, elicited favorable response from many sections of the country. Articles have been prepared and have been accepted for publication in the *Journal of the American Medical Association* and *Parents' Magazine*. Radio addresses have been given over local and national networks by members of the committee and others.

A compilation, "Pertinent Facts on Contact Infection," has been printed for distribution to all physicians and lay persons who wish to prepare talks or articles on this subject.

Another desirable measure to make it possible to illustrate the subject of contact infection of children by adults and its means of prevention would be its dramatization in a moving picture scenario. It is our desire that such a film be produced under the auspices of the Academy. This could be shown before lay groups throughout the country.

It is hoped that the distraction of international affairs will not lessen the progress being made toward control of contact infection of children.

Respectfully submitted,

FAIRFAX HALL, Chairman
GAYLORD W. GRAVES
REGINALD A. HIGGONS
PARK J. WHITE.

Report of the Committee on Cooperation with Nonmedical Groups and Societies

Since the committee's last report to the Executive Board in June, its efforts have been largely concerned with preparations for a meeting of the national committee as a whole and for a meeting with the chairmen of the various state subcommittees at Cincinnati in November. The appointment of subcommittees of the National Committee on Cooperation with Nonmedical Groups and Societies has been completed in all but two or three states. The national committee sent out in January and again in April a letter to each state subchairman explaining the cooperative project now in progress with the summer round-up division of the Parent-Teacher Association and suggested ways in which the state subcommittees might cooperate to further the progress of this work in their respective states. This fall, a questionnaire consisting of the following specific questions was sent to each state chairman in order that the national committee might learn of the existing conditions in the various states. The questions are:

1. Were you contacted by the summer round-up chairman in your state?
2. Would you briefly describe the results of the conference?
3. If such a conference was not held during the past year, is it planned to hold one this next year?
4. Has your committee received official recognition from your state medical society to act in an advisory capacity to the summer round-up organization?
5. Would you state frankly your opinion as to the likelihood of accomplishing something worth while in your state by further perusal of the committee's plan?
6. Was an effort made in your state to publicize either to medical or to lay groups the important facts about health examinations of normal school children?
7. Have arrangements been made to have a paper on health examinations of normal children appear on the next annual program of your State Medical Society?
8. Are you planning to attend the Cincinnati meeting?

It is our understanding that Dr. Lillian R. Smith, chairman of the summer round-up group, is also sending questionnaires to her state chairmen to obtain information from that angle.

Up to the present the chairman of the national committee has received replies from only a dozen or so of the state chairmen. Even among this number

it becomes evident that there are great differences in setups and in opinions as to what can and should be done in the various states. It is the Committee's plan to assemble and classify all the material received and to present it along with Dr. Smith's for discussion at the Cincinnati meeting. Out of this should grow a comprehensive plan for increasing and improving periodic health examinations of normal school children throughout the nation. Both parents and general practitioners need to be educated to the benefits to be derived from carefully conducted well-child conferences.

It had been the hope of the Committee that the sound motion picture film depicting the essentials of a health examination might be available to show before the Academy at the Cincinnati meeting, but Dr. Parmelee states it will be impossible to have it ready by that time. Preparation of the brochure, authorized by the Executive Board at its June meeting, outlining minimum standards for health examinations of normal children, is to be based upon the motion picture and, hence, cannot be completed for at least several months.

In Wisconsin and Iowa arrangements have already been made to have a paper on health examinations of normal children included on the program of the state medical society at the 1940 annual meeting. Several other subcommittee chairmen have indicated that an effort will be made to make similar arrangements in their states.

It is becoming increasingly apparent to the Committee, as its cooperative project with the Parent-Teachers Congress progresses, that the principal objective involved in its work is the setting up of demonstrations in all parts of the country as to how a well-child conference should be conducted. Its aim is the education of parents to want and demand such examinations for their children, and the education of general practitioners in how they should be done. Since pediatricians care for only about 2.5 per cent of the children of the country, it is apparent that a wide field of operation is available for Academy activity.

Respectfully submitted,

LEE FORREST HILL, Chairman
DENNIS H. KELLY, Secretary
C. A. ALDRICH
JAMES W. BRUCE
JOSEPH A. JOHNSTON
ALBERT D. KAISER
MARGARET NICHOLSON
WARREN SISSON
HENRY E. UTTER

Report of the Committee on Medical Supervision of Camps

Since the formation of the Committee on Medical Supervision of Camps, it has been impossible to have a meeting of the various members. The first meeting will take place at the national meeting of the Academy in Cincinnati in November.

An attempt was made in the early spring to formulate definite policies for the activities of this Committee and contacts were made with the American Camping Association. It was found that the camping interests of different localities varied greatly and that very general problems must be considered by the committee. The problem which has caused us considerable concern is the lack of actual lists of existing camps in various localities. In Massachusetts, for instance, there is no list of camps. Such a list must be formulated before any plan can be put into effect.

In general, there are four subjects which are engaging the interest of the Committee:

1. The need and type of physical examinations.
2. The selection of medical personnel of camps.

3. The supervision of diet.

4. Suggestions which will assist in avoiding fatigue.

State camp committees are actively engaged in assaying local problems, and we are very confident that our committee can make definite contributions to the camping movement.

Respectfully submitted,

WARREN SISSON, Chairman VERNON W. SPICKARD
W. F. FUNKHOUSER HENRY E. UTTER
ROGER L. J. KENNEDY

Report of the Committee on Hospitals and Dispensaries

The Committee on Hospitals and Dispensaries during the past year has conducted a survey to determine what methods and procedures are employed in children's hospitals in this country and Canada to protect the patients from infections which may be acquired from individuals of the hospital personnel. This contact may be direct or through the handling of food. Questionnaires were sent to thirty-three children's hospitals and twenty-six questionnaires were returned with the required data. A report on this survey has recently been submitted to THE JOURNAL OF PEDIATRICS for publication.

Respectfully submitted,

GEORGE F. MUNNS, Chairman LAURENCE R. DEBUYS
JOHN A. BIGLER, Secretary CLIFFORD G. GRULEE
MURRAY H. BASS LEWIS WEBB HILL.

Report of the Committee on Infantile Paralysis

In accordance with the instructions of the Executive Board of the American Academy of Pediatrics, the chairman of this committee wrote to Mr. Basil O'Connor, president of the National Foundation for Infantile Paralysis, suggesting that the national foundation urge that various local committees in cities and states have a pediatrician on their boards. It was pointed out to Mr. O'Connor that in many localities the program and the expenditure of money of the foundation were directed entirely by orthopedists and by lay groups and that the pediatric side of the situation was neglected. It was also stated to Mr. O'Connor that this was not true in all localities, but only in some. The American Academy of Pediatrics urged that the national foundation do everything in its power to remedy this situation.

A letter from Mr. O'Connor may be quoted in part as follows: "I will be very glad to see that the local chapters are urged to have a pediatrician on their boards. In fact, that isn't a matter which has been completely overlooked. It has been suggested in part already but I will see that we continue to urge it."

It might be interesting to quote another paragraph in Mr. O'Connor's letter as follows:

"By the way, it's about time you medical men started simplifying your phrases and names. 'Orthopedists' is bad enough but when you ask a committee of laymen to add a 'pediatrician' to their committee they start looking for a bicycle rider."

Most of the activities of this committee have been carried out since the last report.

Respectfully submitted,

A. GRAEME MITCHELL, Chairman
D. LESESNE SMITH
JOHN A. TOOMEY

Report of the Committee on Medical Education
(Subcommittee on Postgraduate Education)

We have kept in touch with the activities in which we are interested. We have cooperated with the council on medical education of the American Medical Association and have supplied counsel and assistance to many states in regard to objectives and practices of our program; many instructors have written in requesting assistance of one sort or another.

There has been a general continuance of interest in the postgraduate activities in pediatrics of an extramural type, and probably the one most important thing we should add to previous recommendations in regard to these courses is that within the same community one should not give the same courses over and over again, year after year. There should be such a diversity of appropriate topics for discussion that the interest of the doctors coming back for repetition of the course is not lost because the same thing is being said as was said the year before. It would, therefore, seem that within a given community or district a program should be laid out to cover a period of four to five years, during which time there would be no repetition of the same topics within that particular district. There has been a rather amazing increase in complaints of this sort during the past summer.

Respectfully submitted,

GEORGE M. LYON, Chairman
HORTON CASPARIS
HUGH L. DWYER.

Report of the Committee on Mental Hygiene

The Committee on Mental Hygiene has been trying to carry out the following program which was approved by the Academy:

I. Adequate training in the medical schools as follows:

(1) Instruction during the first two years in medical school to include lectures on mental health.

(2) A formal course on mental growth and development, the mental aspects of various disease conditions and common mental hygiene problems to be given during the last two years of medicine. The chairman of the Educational Committee of the National Committee for Mental Hygiene suggests that such a course should be at least 12 hours in length.

(3) The use of a well-baby clinic as a means of teaching mental health to children.

(4) A mental health clinic in the Pediatric Department.

(5) Cooperation between the pediatric and psychiatric departments.

II. Adequate training of the pediatric intern and resident as follows:

(1) An opportunity to work in a mental hygiene clinic during a part of his internship or residency.

(2) An opportunity to attend seminars conducted by staff men qualified to give them the proper attitude toward mental health.

(3) An opportunity to study mental health in well-baby and older children's clinics.

III. In order to stimulate a more active interest in mental hygiene among pediatricians and to bring to their attention the valuable information found in medical literature, other than pediatric journals, it is suggested that a program be worked out for the publication of articles, extending over a period of several years, dealing with pertinent facts on mental health. These articles are to be published in THE JOURNAL OF PEDIATRICS. The Committee is now working on that program.

Recommendations I and II fall in the field of the Committee on Medical Education. In cooperation with this committee, the Committee on Mental Hygiene is formulating a suggested program for teaching which will be submitted to the heads of the pediatric departments of the medical schools this fall.

In carrying out recommendation III, a series of articles on the various aspects of mental health is being published in THE JOURNAL OF PEDIATRICS.

Papers on mental health make up a very small part of most pediatric programs. This is especially true of the national meetings. We believe that such papers are desired by a large percentage of pediatricians, especially the younger men.

The committee welcomes suggestions from all members of the Academy. The support and cooperation of all members are essential to the successful carrying out of the program.

Respectfully submitted,

BERT I. BEVERLY, Chairman	BRONSON CROTHERS
C. A. ALDRICH	GEORGE MOHR
FREDERICK H. ALLEN	ARTHUR H. PARMELEE
HORTON CASPARIS	VICTOR E. STORK

Report of the Committee on School Health and School Health Education

The variety of professional and citizen groups interested in school health programs has been mentioned in a previous report of your committee. A group which met in November, 1938, in New York is now scheduled for another meeting to "facilitate the cooperation of national official and voluntary health and education agencies." This is the National Conference for Cooperation in School Health Education. Forty-six national agencies have been invited to send delegates. Professor Ira V. Hiscock of Yale University is chairman and Dr. N. P. Neilson of the National Education Association is Secretary. These representatives will meet at Rockefeller Center, New York City, on November 3 and 4, 1939.

The U. S. Office of Education has called two conferences to consider a proposed amendment to S. 1620 (the so-called Wagner Health Bill). The chairman of this Academy committee was invited to one of these conferences. This amendment to the Social Security Act is proposed to provide each state with funds to be used for "the planning and improving of school programs in education for healthful living (not to include medical or dental treatment) including the training of personnel and the development of teaching materials and methods, especially in rural areas and in areas suffering from severe economic distress."

While the objectives of "planning and improving" school health programs are undoubtedly desirable, in the interest of the public welfare and in line with the expressed aims of the American Medical Association, there are serious questions raised by this proposed amendment in order that these objectives may really be achieved. In any case it is important that large federal subsidies to states should not encourage organization plans that may conflict with sound school health program development already under way. For this reason, your committee will watch the promotion of this proposed legislation and be prepared to make recommendations concerning it.

Your committee will consider at the Cincinnati meeting the development of an acceptable statement for distribution concerning the use of health examinations in schools, the tendency to claim too much for inadequate school examination

service, the effect of mandatory laws concerning annual examinations, and the recommendation of sound medical policies as they relate to the school health examination.

The mimeographed statement, "Suggested School Health Policies," distributed to the state committees on school health has been approved by your national Committee on School Health and School Health Education. This statement will be considered by committees representing four sections of the American Public Health Association, the American School Health Association, and representatives of several other professional groups including the American Medical Association, at the meeting of the American Public Health Association at Pittsburgh on October 19. This plan of discussion and criticism is designed to determine a consensus of opinion regarding policies before publication.

Respectfully submitted,

HAROLD H. MITCHELL, Chairman
ROCKWELL M. KEMPTON
M. HINES ROBERTS
A. CLEMENT SILVERMAN
CLIFFORD D. SWEET
ARTHUR E. WADE
ESTELLA F. WARNER
LEROY A. WILKES

Report of the Council for Pediatric Research

This is in the nature of a final report of this committee so far as its present organization and methods of operation are concerned, as the funds provided for its two years' experimental operation, plus what it has received in fees, are practically exhausted; and, if it is to continue, it must be on some different basis.

Our financial situation is as follows: We have received from the Carnegie Corporation, on the basis of a budget submitted to and approved by them, $20,000; and from commercial firms, for grants allocated through the council, $15,608.75, with $6,396.25 due shortly making a total of $21,005.00 of which $18,755.00 goes to the investigators and $2,250.00 in fees to the council. We had on hand September 1, and in perfectly good accounts receivable, approximately $1,390.00.

It must be admitted that so far as our experience of two and one-half years goes, the demand for such services as the council has to offer has not been so great as we had expected from our preliminary surveys of the field. We have been concerned to discover why, aside from oversanguineness on our part, this should be. Several reasons have become evident in the course of our operations:

1. (And this we understood from the start.) A number of the more important firms have their own perfectly competent directors of research, and—except in rare cases—need our services, if at all, only to give studies which they subsidize a better ethical standing.

2. A greater proportion of the firms than we had realized who profess an interest in subsidizing "research" do not really care anything for the scientific value of the investigation, so long as the published article gives them something which they can play up in their advertising. Even some clinics and laboratories of what should be first-rate standing seem to lend themselves rather too readily to this procedure, and there seems to be nothing the council can do about it until the stamp of its approval comes to carry sufficient weight so that readers will look for it and feel doubtful about subsidized papers not carrying this stamp. It is possible that if the editors of the journals would insist on declaration of the source of funds with every subsidized study this situation might be partly remedied, as it is evident that such financial support is not always acknowledged. It would help, too, if more of the clinics which are approached would state a preference

for working through the council. Publication of the results of council-supported investigations should be of value to us when these publications begin to appear, but the period between allocation of a grant by the council and publication of results is so long that we have not yet begun to feel the benefit of such advertising.

3. A considerable proportion of the questions brought to us by perfectly well-intentioned firms do not offer worth-while problems for scientific study, and would have really nothing more than an advertising value, which, of course, has no interest for the good clinics. We cannot conscientiously encourage this sort of thing by referring such firms to less scrupulous clinics.

4. The period during which we have been operating has been one of general business uncertainty, which unquestionably has been reflected in the attitude of commercial firms to questions of possible subsidization of research. There are other minor reasons, but these seem to be the chief ones.

What value the work of the council has had seems to be a fair question. We have mentioned in previous reports the information we have accumulated on research facilities, research in progress, personnel, and sources of funds. This has been done largely by questionnaires, but also by personal visits to clinics and laboratories; the information is fairly complete, though we doubtless miss some good clinics not definitely connected with teaching institutions. Such information is of considerable value to others than ourselves and is not available elsewhere. Our files on these subjects have been in use for the past year or more by the American Foundation in connection with a study of research which they are carrying on.

The allocation of research funds through the council, so far as it has gone, has seemed to us very well worth while. We have handled four main projects, and in each case the study has been with our help so devised as to give good expectation of results of real scientific value, as well as aiding in the solution of the immediate problems of the manufacturer. In addition to this, the funds dispensed have been a real help for the support of clinics not otherwise well endowed and have enabled some very promising young investigators to carry on with work which otherwise they might have had to drop. Our methods of handling these matters and the results which are being obtained have seemed highly satisfactory to both manufacturers and clinics involved. The question is whether it is probable that in time we shall have enough increase in volume of work to justify our continuance, and, if so, how we shall carry on in the meantime. We are committed to some sort of continuing organization until the studies we have sponsored are completed and finally passed upon, but this need be no more than a skeleton organization. The proposed plan is to continue the salary of the secretary to the secretary of the council and to discontinue the salary of the secretary himself.

We have no concrete suggestions as to just what the fate of the council is to be, but as we are a committee of the Academy we should like the Executive Board to consider the question and offer suggestions. If we had more definite projects in view than there are at present, we might feel justified in proposing to borrow from the Academy, but just now this hardly seems feasible. It is evident from the course of events that we planned on too short a trial period. This cannot now well be corrected. We are convinced that our original idea was sound and that, if we can manage to carry on long enough to make our influence more widely felt, we shall succeed not only in putting the whole matter of subsidization of investigation by manufacturers on a more dignified basis, but also eventually in the accumulation of "free funds" for the promotion of research, and subsidies to maintain promising investigators in clinical investigation of pediatric problems.

Respectfully submitted,

THOMAS B. COOLEY, Executive Secretary of the Council.

Report of the Committee on Legislation

The Committee on Legislation has the honor to submit the following report for the consideration of the Academy:

The only subject of legislative importance coming within the purview of the Committee on Legislation during the past year has been the introduction in the Congress of the Senate Bill No. 1620, cited by its proponents as the "National Health Act of 1939" and commonly termed the "Wagner Health Bill" in honor of Senator Wagner of New York, who introduced the bill on February 28 (legislative day, February 27), 1939.

Believing that the passage of this bill might deeply affect the interests of the member pediatricians of this Academy, the Chairman of the Committee on Legislation immediately provided the members of the committee with copies of S. 1620, together with a copy of the statement of Senator Wagner when introducing the measure, and requested the members of the committee to give careful consideration to the proposed bill as it affected the interests of the members of this Academy.

Under date of June 21, 1939, Secretary Clifford G. Grulee notified the chairman of this Committee that the matter of discussion of the Wagner Health Bill had been given a place on the program of the business meeting during the Cincinnati assembly of the Academy.

Inasmuch as the approval or disapproval of this bill may with propriety come to a vote before the Academy membership, a brief outline of the provisions of the bill, more especially those relating to pediatrics, is herewith submitted.

The National Health Act of 1939 proposes to amend the Social Security Act in the following respects:

Section 2, Title V, Parts 1, 2, and 5 of the Social Security Act to read as follows:

TITLE V—GRANTS TO STATES FOR MATERNAL AND CHILD WELFARE

Part 1. Maternal and Child Health Services

Section 501.—"For the purpose of enabling each state, as far as practicable under the conditions in such state, especially in rural areas and in areas suffering from severe economic distress, to extend and improve services, supplies, and facilities for promoting the health of mothers and children, and medical care during maternity and infancy, including medical, surgical, and other related services, and care in the home or in institutions, and facilities for diagnosis, hospitalization, and after-care; and to develop more effective measures for carrying out the purposes of this part of this title, including the training of personnel, there is hereby authorized to be appropriated for the fiscal year ending June 30, 1940, the sum of $8,000,000; for the fiscal year ending June 30, 1941, the sum of $20,000,000; for the fiscal year ending June 30, 1942, the sum of $35,000,000; and there is hereby authorized to be appropriated for each fiscal year thereafter a sum sufficient to carry out the purposes of this part of this title."

The remaining paragraphs of Title V, Part 1 relate to matters of administration by the chief of the Children's Bureau and will not be quoted except paragraph 5, Section 503 (a) which reads: "provide for an advisory council or councils, composed of members of the professions and agencies, public and private, that furnish services under the state plan, and other persons informed on the need for, or provision of, maternal and child health services";

Section 503 (a) paragraph 7: "provide for cooperation and, when necessary, for working agreements between the state health agency and any public agency or agencies administering services related to the services furnished under the

state plan, including public agencies concerned with welfare, assistance, social insurance, education, or medical care'';

Under paragraph 5, member pediatricians may be called upon to serve on such council or councils as are provided for in the bill.

In regard to paragraph 7, under the Social Security Act, approved August 14, 1935, a state plan for maternal and child health services cannot be approved unless it provides for ''cooperation with medical, nursing and welfare groups and organizations.'' (Sec. 503, a.) The same condition is imposed with respect to state plans for services for crippled children; approval is conditional on provision being made for cooperation with medical, health, nursing, and welfare groups and organizations. (Sec. 513, a.) The Wagner Health Bill makes no provision for such cooperation with private agencies in either case but requires provision for cooperation only with public agencies. The word ''public'' must be interpreted ''governmental,'' in view of the wording of lines 22 and 23, paragraph 5, page 4, of the National Health Bill which designates ''private'' as opposed to ''public'' in the formation of advisory councils.

This elimination of cooperation with private agencies does away with the necessity for the existence of cooperative committees in the Academy of Pediatrics, The American Pediatric Society, the Section on Pediatrics of the American Medical Association, or in any state or county medical societies.

TITLE V, PART 2—MEDICAL SERVICES FOR CHILDREN AND SERVICES FOR CRIPPLED CHILDREN AND OTHER PHYSICALLY HANDICAPPED CHILDREN

Section 511.—''For the purpose of enabling each state, as far as practicable under the conditions in such state, especially in rural areas and in areas suffering from severe economic distress, to extend and improve services, supplies and facilities for the medical care of children, and services to crippled children and other physically handicapped children in need of special care, such services and facilities to include medical, surgical, corrective, and other related services and care in the child's home or in institutions, and facilities for diagnosis, hospitalization, or other institutional care, and after-care; and to develop more effective measures for carrying out the purposes of this part of this title, including the training of personnel, there is hereby authorized to be appropriated for the fiscal year ending June 30, 1940, the sum of $13,000,000; for the fiscal year ending June 30, 1941, the sum of $25,000,000; for the fiscal year ending June 30, 1942, the sum of $35,000,000; and there is hereby authorized to be appropriated for each fiscal year thereafter a sum sufficient to carry out the purposes of this part of this title.''

The remaining paragraphs of Part 2 relate largely to administrative matters of no especial interest to the membership excepting paragraph (a) Sec. 512, relating to the matching of state funds: ''In determining the allotments under this section, the following factors for the respective states shall be taken into consideration: (1) The child population; (2) the number of children in each state in need of the services; (3) the special problems of medical care of children; and (4) the financial resources.'' (The last word evidently refers to the resources of the state and not the beneficiaries, although the wording is confused.)

Attention of the Academy membership should be called to the words ''medical care of children'' which appear repeatedly throughout this section and title, as well as to the definitions of ''medical care of children'' appearing in Sec. 501 and in Sec. 511.

Title V, relating to maternity and child health and (Part 2) medical services for children, and services for crippled and otherwise handicapped children, will be administered by the chief of the Children's Bureau, Department of Labor.

TITLE VI—PUBLIC HEALTH WORK AND INVESTIGATIONS

PART 1—PUBLIC HEALTH WORK

Section 601—"For the purpose of enabling each state, as far as practicable under the conditions in such state, especially in rural areas and in areas suffering from severe economic distress, to extend and improve public health work, including services, supplies and facilities for the control of tuberculosis and malaria, for the prevention of mortality from pneumonia and cancer, for mental health, and industrial hygiene activities, and to develop more effective measures for carrying out the purposes of this part of this title, there is hereby authorized to be appropriated for the fiscal year ending June 30, 1940, the sum of $15,000,000; for the fiscal year ending June 30, 1941, the sum of $25,000,000; for the fiscal year ending June 30, 1942, the sum of $60,000,000; and there is hereby authorized to be appropriated for each fiscal year thereafter a sum sufficient to carry out the purposes of this part of this title. . . ."

Pediatricians have, more or less, but limited interest in this Title VI, Part 1, and then only as it applies to the occurrence of tuberculosis, malaria, pneumonia, and disorders of mental health among the young.

Title VI, Part 2, "Investigations" relates to the making of such by the National Institute of Health in matters of health, disease, sanitation, and matters pertaining thereto. . . .

The administration of Title VI is under the direction of the Surgeon General of the U. S. Public Health Service.

TITLE XII—GRANTS TO STATES FOR HOSPITALS AND HEALTH CENTERS

Section 1201—"For the purpose of enabling each state, as far as practicable under the conditions in such state, especially in rural areas and in areas suffering from severe economic distress, to construct and improve needed hospitals, to assist the states for a period of three years in defraying the operating cost of added facilities, and to develop more effective measures for carrying out the purposes of this title, there is hereby authorized to be appropriated: (1) in respect to general hospitals, for the fiscal year ending June 30, 1940, the sum of $8,000,000; for the fiscal year ending June 30, 1941, the sum of $50,000,000; for the fiscal year ending June 30, 1942, the sum of $100,000,000; and (2) in respect to mental and tuberculosis hospitals, for the fiscal year ending June 30, 1940, a sum sufficient to carry out, in respect to such hospitals, the purposes of this title; and there is hereby authorized to be appropriated for each fiscal year thereafter a sum sufficient to carry out the purposes of this title. . . ."

Title XII, Section 1203, paragraph 4, provides "that ownership of real estate, improvements, and equipment be vested in the state or its political subdivisions." This provision excludes from the benefits of the act any existing or contemplated private hospitals and authorizes such benefits to governmental structures only.

Paragraph 6 of this section of Title XII makes it incumbent upon the states to "provide a system of financial support which will give reasonable assurance of continuing maintenance of added hospitals and of their potential availability to all groups of the population in the designated area subject only to the suitability of the hospitals for particular diseases and conditions and to the financial arrangement for payment for service; . . ." This last phrase probably authorizes private ward and private room service in the state hospitals "constructed and improved," but the wording of the bill is ambiguous. Section 1209 of this title contains this definition: "The term 'hospital' when used in this title, includes health, diagnostic, and treatment centers, institutions, and related facilities."

Title XII is to be administered by the Surgeon General of the U. S. Public Health Service.

TITLE XIII—GRANTS TO STATES FOR MEDICAL CARE

Section 1301—"For the purpose of enabling each state, as far as practicable under the conditions in such state, especially in rural areas and among individuals suffering from severe economic distress, to extend and improve medical care (including all services and supplies necessary for the prevention, diagnosis and treatment of illness and disability), and to develop more effective measures for carrying out the purposes of this title, including the training of personnel, there is hereby authorized to be appropriated for the fiscal year ending June 30, 1940, the sum of $35,000,000; and there is hereby authorized to be appropriated for each fiscal year thereafter a sum sufficient to carry out the purposes of this title."

Under the heading "appropriations" both in this Title XIII and the last title of the bill, Title XIV, both to be administered by the Social Security Board, there is no limit to the size of the appropriations after June 30, 1940, but in each instance, the wording of the bill states that a sum is to be authorized for appropriation each fiscal year "sufficient to carry out the purposes of this title."

TITLE XIV—GRANTS TO STATES FOR TEMPORARY DISABILITY COMPENSATION

This title does not particularly concern pediatricians as Section 1405 (a) states that "The term 'temporary disability compensation' means cash benefits payable to individuals for not more than fifty-two weeks and with respect to their disability not arising out of or in the course of employment."

There is, however, one paragraph (Title XIV, Sec. 1420, paragraph b) which should be noted by all physicians studying the provisions of this bill, to wit: "(b) The Board shall approve any plan based upon a law which fulfills the conditions specified in subsection (a), except that it shall not approve the plan of any state which does not have a plan or plans approved under this Act under which the Board finds that reasonably adequate medical service, including preventive services, are available to minimize disability among those covered under the state plan for temporary disability compensation."

Although the words "social insurance" are eliminated from the preamble stating the purpose of the National Health Act, and such wording undoubtedly means "sickness insurance," the paragraph of Title XIV just quoted makes it obligatory that states which wish to enjoy the benefits of the act must provide by law for "sickness insurance" or forego the benefits of the appropriations authorized by the bill.

Under each title the words "social insurance" appear in the paragraphs relating to cooperation with state (governmental) agencies.

The committee has made no effort to sum up the total expenditures annually to be made under the provision of the bill, but it has been estimated by the Technical Committee that after the lapse of ten years, the annual expenditures will approximate one billion dollars per year.

The subcommittee of the Committee on Education and Labor, under the chairmanship of Senator Murray, as a result of the extensive hearings already conducted throughout the early summer, has indicated the necessity for further study of the provisions of this bill; to wit: "This subcommittee, having studied this bill, held numerous public hearings and accumulated a large volume of testimony and supplementary information, reports that it is in agreement with the general purposes and objectives of this bill. However, the subcommittee wishes to give this

legislation additional study and to consult further with representatives of lay organizations and of the professions concerned. The subcommittee intends to report out an amended bill at the next session of Congress.'' (Preliminary report on S. 1620 by Senator Murray.)

The Committee on Legislation has attempted to present to the membership of the Academy a synopsis of the Wagner Bill, more especially as it applies to pediatricians, in order that the members may by vote express their views in regard to the enactment of this measure and that the duly constituted committee of the Academy may be authorized to communicate the opinion of the membership to the Senate Committee on Education and Labor.

Respectfully submitted,

JOSEPH S. WALL, Chairman
ISAAC A. ABT
JAY I. DURAND
PHILIP VAN INGEN
ALFRED A. WALKER

Report of the Committee on Revision of the Pharmacopoeia

It is suggested:

1. That, the name of the Committee be changed from ''Revision of the United States Pharmacopoeia and National Formulary'' to the ''Committee on Therapeutics and General Therapeutic Procedures'';

2. That, the editors of the JOURNAL OF PEDIATRICS solicit articles from outstanding pediatric authorities on pediatric therapeutics, which articles should be published from time to time in the JOURNAL OF PEDIATRICS.

3. Consideration for publication similar to the pamphlet, ''Report of the Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases,'' on pediatric therapy and therapeutic procedures, including pediatric dosage.

Respectfully submitted,

ISAAC A. ABT
WILLIAM N. BRADLEY
BERNARD FANTUS
H. HARRIS PERLMAN
LOUIS W. SAUER

Report of Committee on Medical and Hospital Insurance

Group Hospital Insurance

The purpose of the investigation and study by this committee is to advise the membership of what seems to be the most prudent stand for Academy members to take toward hospital insurance organizations and to show how they may participate in the benefits.

Group Hospital Insurance affords the insured an inexpensive contract affording limited hospitalization. The insured may include the dependents of the insured for moderate extra cost. Some plans include surgical benefits. These, too, may be offered the dependents.

It is pleasing to hear from those high in the executive staff of a leading insurance company, that while the first year proves a high cost to any organization, all the years thereafter show profit. They also offered the statement that they may soon extend the scope of their contracts or may lower the cost to the insured groups.

Surprisingly, the leading insurance organizations are not interested in continuing the usual accident and health policy which costs for operation 65 per cent of the premium and affords only 45 per cent protection to the assured. They are concerned with protecting the low pay group of employees. They are not interested in the higher salaried groups who can afford their own hospitalization.

I found that one organization had recently canceled their contracts to the tune of 5,750 contracts because their early receipts were so much in excess of their needs, and their expense was so much less than that figured that they immediately increased their benefits, regardless of contracts. This put them in the *red*. They tried to operate without the advice of experienced insurance actuaries. This was fatal and should teach us the lesson that, although we operate without profit, we need expert advice on the operation of these companies whether statewide or municipal in scope.

They further advised us to adhere closely to contracts, and assured us that the inclusion of dependents in the group plans is not a liability and should benefit the physician, the hospitals, and the assured. Most plans require that the employer pay a percentage of the cost, which is indeed a social advantage.

Trouble occurs as it did in Toronto and in New York where surgical benefits stipulate the amount of benefits to be paid in a set schedule or contract. There was no intention that these amounts were to represent the entire fees to be charged, but naturally, unless specifically stated there is a tendency for the assured to barter with the physician, surgeon, or specialist to try to secure the complete service for this stipulated schedule of benefits; viz., say they allow $25 toward the tonsillectomy fee. The surgeon must have an understanding that the $25 only applies *toward* his fee. We are assured by the insurance executives that they will endeavor to make that point clear on contracts.

Again they may allow $10 for pediatric consultation and go so far as to stipulate how and when you may be consulted even to defining a pediatric specialist and his scope of practice.

Here is the practical value (we hope) of this study. There seems to be no probability of any individual plan to be offered to the public, only groups seem to be considered. This affords low cost of operation and reaches the group and the people who need this protection.

Therefore, we recommend that wherever possible the Academy membership avail itself of any opportunity to assist in the direction of these organizations to aid in assuring stability of operation and to work for inclusion of dependents in these groups, thus enabling the pediatrist to participate in the benefits of a movement that promises to relieve the burden of the low salaried group, at the same time affording to them and their dependents every needed medical and surgical care.

Respectfully submitted,

STERLING H. ASHMUN, Chairman
FREDERICK F. TISDALL
HUGH BERKELEY

Report on Publicity

Since our publicity report to the Executive Board on June 17, we have received 347 newspaper clippings that are the direct result of our publicity efforts in behalf of the Academy. These are based on the June meeting of Region I in New York City, and they represent newspapers both large and small in every part of the country.

These clippings have been mounted and bound in books which we have submitted to the Executive Board.

We would particularly like to call your attention to the series of articles written by the well-known syndicate writer on child care, Gladys Huntington Bevans, who at our invitation attended several sessions of the Region I meeting.

Her articles reviewed subjects discussed at the meeting and ran for over a week, beginning on July 3, in the *Chicago Tribune*, *New York News* and other newspapers subscribing to the Tribune-News Syndicate.

With the 446 newspaper and magazine clippings submitted to the Executive Board with our last report, this makes a grand total of 793 clippings that have been accumulated since we began a public educational program for the American Academy of Pediatrics on January 1.

This means, according to the circulations of the publications concerned, that over 45,000,000 newspaper and magazine readers have been reached with stories about the Academy and its members in the past ten months.

In the last four months, we have emphasized particularly our function as counsel on local publicity problems. This effort was confined to Illinois and the Chicago area because, through the proximity of your Secretary's office, members of the Academy in this region are more familiar with our work as department of information for the press and the public and have asked for assistance as it was needed.

What we have done in this restricted area, we are prepared to do in every state and city where there are local committees of the American Academy of Pediatrics with information that they wish to disseminate to the public.

In Illinois during this period, we have worked with two state committees of the Academy—the committee on school health and the mental hygiene committee. The committee on school health has recently completed an informative survey of the school health situation in representative Illinois cities. Using this material as a basis, we have prepared and submitted sample news stories to the committee and, upon their approval, will take charge of releasing these through the most effective news channels in the state, as well as to the national press services.

We have kept in touch with the plans of the Illinois mental hygiene committee which has undertaken an extensive campaign for the establishment of an institution for borderline cases of feebleminded children. This project is of necessity long-range in character and much background material must yet be gathered before publicity can be brought into full play.

In the meantime, we have met with the committee and discussed the necessary factual data that should be gathered for a publicity program and indicated the role that we can take in the project. Our first step has been to release to Chicago newspapers and the press services a résumé of a radio speech made by a member of the committee that presented the need for such an institution.

Still in the field of local publicity, but outside the Chicago area, we released to New York City newspapers and the national press services a résumé of a radio address made by a member of the national committee on contact infections.

At the present writing, we are well along with our advance publicity plans for the national meeting in Cincinnati. Every publicity medium from newspapers and magazines through radio and syndicate writers on child health subjects are included in these plans.

Two Cincinnati radio stations have already spoken for seven talks by Academy fellows during the three-day meeting, and the other three stations have been interested in arranging for similar programs. It is probable that some of these will be picked up by one of the national broadcasting systems for a coast-to-coast broadcast.

Altogether, we expect our publicity program for this meeting to bring the Academy and its aims before an even larger section of the public than has been reached to date.

Respectfully submitted,

(Mr.) Lawrence H. Selz.

Report of the Nominating Committee

Recommendations:

For Vice-President (President-elect) Dr. Richard M. Smith, Boston, Mass.
For Chairman of Region I—Dr. Stanley Nichols, Asbury Park, N. J.

Respectfully submitted,

Dr. Borden S. Veeder, Chairman — Dr. M. Hines Roberts
Dr. Albert D. Kaiser — Dr. Victor E. Stork

Report of the Committee on Honorary Members

(Necessitating change in the Constitution and By Laws as indicated)

The committee is agreed that there should be created a group of honorary members and suggests that this class of membership be restricted to pediatricians. Dr. E. Gorter of Holland is at present the only pediatrician who is an associate member. The Committee suggests that he be transferred to honorary membership and that at the time of the next International Congress, several more prominent pediatricians from foreign countries be elected to honorary membership, to keep him company.

We suggest that the list of associate members be otherwise not changed, except that it be added to from time to time, as we feel that a relatively large associate membership, composed of men who are prominent in fields ancillary or interlocking with pediatrics, is a distinct asset to the Academy.

In order to provide for honorary membership, we suggest the following changes in the Constitution and By-Laws.

Page 5. Article V, change heading to "Associate and Honorary Members."

Article V, Section 1, add "and honorary members."

Change Section 2, Article V, as follows:

Associate and honorary members shall receive publications of the Academy and participate in its clinical sessions, but they shall not be permitted to vote or hold office.

By-Laws, page 13, add new ARTICLE VI, as follows:

"ARTICLE VI

"*Honorary Fellows: Their Qualifications, Proposal and Election.*

"*Section 1. Qualifications.* Pediatricians of outstanding achievement from other countries may be elected to honorary membership. This class of membership shall be restricted to pediatricians.

"*Section 2. Election.* Election of honorary members shall be by deliberation of the Executive Board, and shall require a majority vote of that body.

"*Section 3. Fees and Dues.* Honorary members shall not be required to pay membership fees, annual dues, or special assessments."

Article V, page 13, Section 3, add "or special assessments."

Articles VII-XIII, pages 13-16. Change numbers over to conform with insertion of new Article VI.

Respectfully submitted,

Dr. Lewis Webb Hill, Chairman — Dr. Jay I. Durand
Dr. Robert Blessing — Dr. James B. Stone

News and Notes

The officers of the **International Pediatric Congress** scheduled for Boston in 1940 have announced that the Congress has been indefinitely postponed. At the meeting of the Academy in Cincinnati it was voted that the membership fund paid by Academy members during the past two years be held intact pending future developments and plans.

At the meeting of the **American Academy of Pediatrics** in Cincinnati Dr. Richard Smith of Boston was elected president-elect to succeed Dr. Joseph Bilderback of Portland, Ore. Dr. Stanley Nichols was elected to the Executive Committee as representative for Region I.

Memphis, Tennessee, has been selected for the annual meeting of the Academy next year.

Dr. Alexander Crump Kirby of Little Rock, Ark., died early in November.

The Seventeenth Annual Meeting of the **American Orthopsychiatric Association** will be held at the Hotel Statler, Boston, Mass., on Feb. 22, 23 and 24, 1940. (Dr. Norvelle C. LaMar, secretary, 149 E. 73rd St., New York, N. Y.)

Comments

The ninth annual meeting of the Academy, which was held in Cincinnati November 16-18, was by far the most successful meeting which the Academy has held. It indicated that the change of time from the spring to the fall of the year was a wise decision. The total registration was 753, of whom 348 registrants were Academy members. There were 201 guests, including 20 "official guests" who took part on the program, 124 registered as exhibitors, and 80 members were accompanied by their wives. The hotel facilities were unusually good and the meeting halls and rooms sufficient in number and ample in size. The annual meeting of the Board of Pediatrics and an examination were held the two days previous to the opening of the Academy meeting on Thursday morning.

The first morning was given over to registration and two panel discussions, one on chemotherapy under the leadership of Dr. Alexis Hartmann, and the other on thyroid under the guidance of Dr. A. J. Carlson. On Thursday ten round tables were held, which with the panel discussions will appear in the JOURNAL from time to time. The business session was held Thursday night while the luncheon hour was given over to committee meetings. Following the address of the retiring president, Dr. Helmholz, which appears in this issue of the JOURNAL, Dr. Bilderback took over the chair and the presidential duties for the coming year, and Dr. Richard Smith of Boston was elected president-elect to succeed Dr. Bilderback. Numerous brief committee reports were made verbally of the complete reports which will be found in the proceedings, and some important resolutions were adopted. It is amazing to note the number of projects and interests in which the Academy is engaged.

The Friday morning session was given over to another group of round tables, and at the afternoon session the recipients of the E. Mead Johnson Awards for research in pediatrics published in the calendar year 1938 were announced. The first award was given to Dr. Frederick A. Gibbs of Boston and the second to Dr. Dorothy H. Andersen of New York. Following papers by the recipients of the awards, two guest speakers, Dr. T. Duckett Jones of Boston and Dr. Lewis T. Bullock of Los Angeles, presented scientific papers. These papers will be found in this issue following the presidential address.

Over 300 attended the banquet on Friday night which was followed by dancing. Saturday morning the third group of round tables was held.

The educational scientific and commercial exhibits were instructive and interesting with a total of 56 exhibits.

Owing to the postponement of the International Pediatric Congress which was to have been held in Boston next September, the executive Committee accepted the invitation of Memphis for the tenth annual meeting in the fall of next year.

A comment on the meeting is incomplete without an acknowledgment of the splendid way in which every detail was planned and carried out by the secretary, Dr. Grulee. The success of the meeting was due in large part to his careful planning and untiring efforts.

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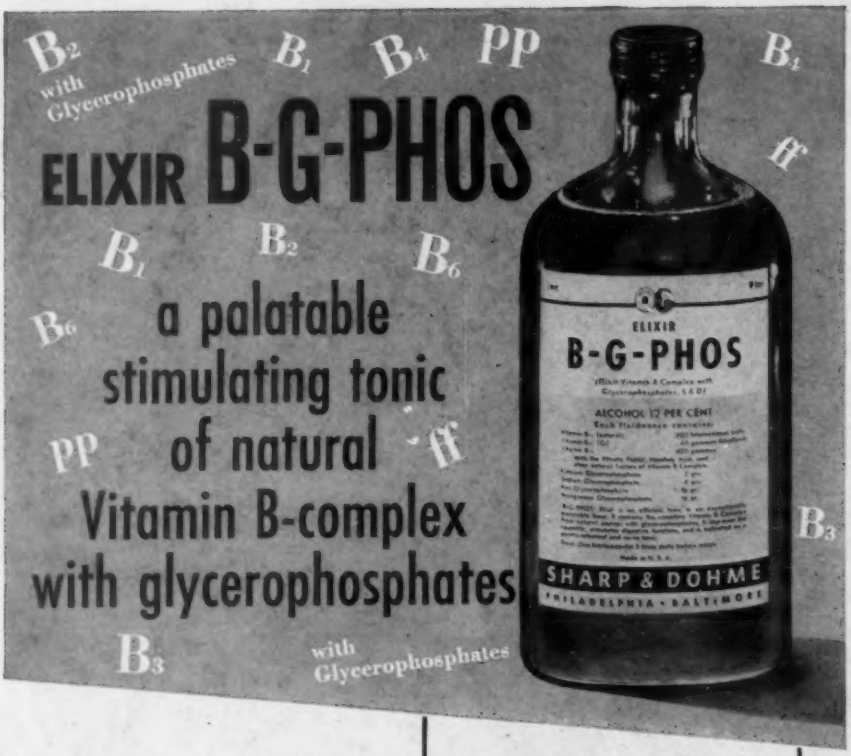

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